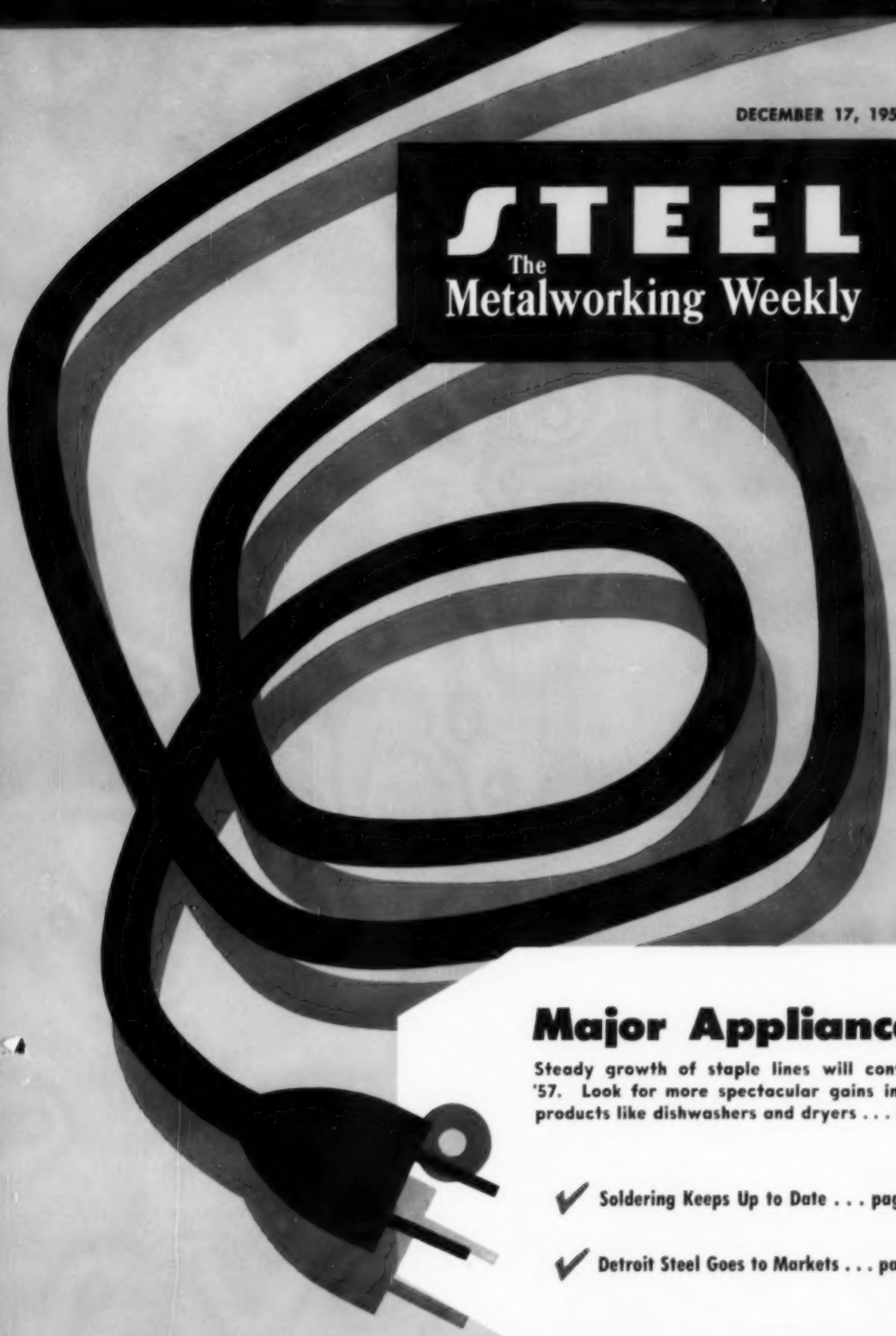
DECEMBER 17, 1956

STEEL
The Metalworking Weekly



Major Appliances

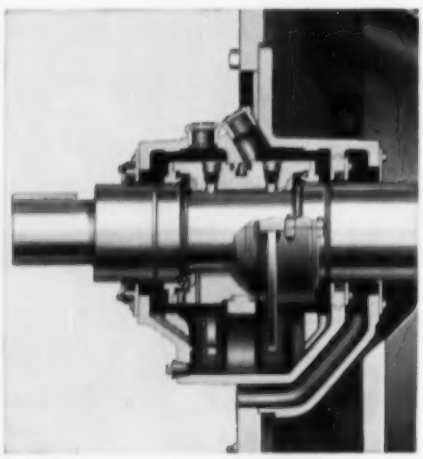
Steady growth of staple lines will continue in '57. Look for more spectacular gains in newer products like dishwashers and dryers . . . page 53

✔ Soldering Keeps Up to Date . . . page 86

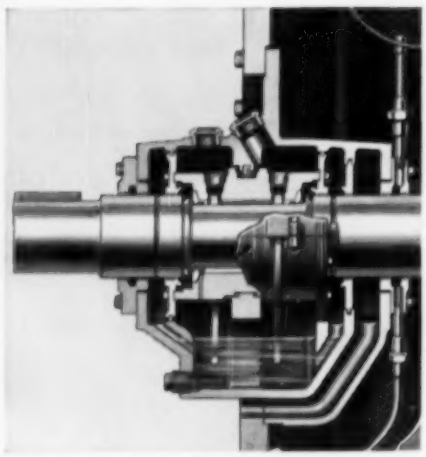
✔ Detroit Steel Goes to Markets . . . page 121

NEW Bearing Design Means Better Motor Performance

Allis-Chalmers capsule-type sleeve bearings now perfected for complete motor line



Standard capsule-type sleeve bearing



High speed capsule-type sleeve bearing

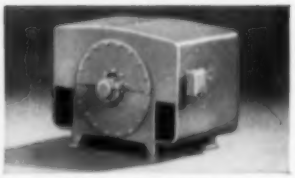
A new feature—an improved capsule-type bearing design—has been added to the Allis-Chalmers complete line of large end-shield bearing motors. This new bearing will give you better motor service, simplified maintenance and longer motor life through features like:

- Dust-tight, leakproof enclosure protects bearing from dirt, dust or abrasive materials.
- Venting system prevents oil leakage — keeps oil and vapor from getting into motor enclosure.
- Dual oil-rings insure bearing surface lubrication — either ring can adequately lubricate bearing.
- Split end-shield gives easy accessibility to winding and air gap — without disturbing capsule or bearing alignment.

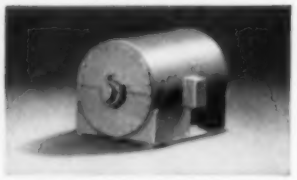
Drip-proof or splash-proof cage motor

Synchronous or wound-rotor motor

High speed cage motor



Weather-protected motor



Totally-enclosed fan-cooled motor

Totally-enclosed forced-ventilated motor

Water-cooled or inert-gas-filled motor

Capsule-type bearings are standard on these Allis-Chalmers motors.

You get **MORE** from Allis-Chalmers motors

More design and construction features — more application help. For complete information, contact your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

A-5032

WELDING PLATE GIRDER FOR CONNECTICUT HIGHWAY BRIDGE

This 120-ft-long welded plate girder is one of eight fabricated at the New Market, N. J., shop of Harris Structural Steel Company for an expressway bridge in Connecticut. Made entirely from Bethlehem plates, each of the girders weighs 22 tons, has a web 120 ft long and ½ in. thick, while the top and the bottom chords vary in thickness from ⅞ in. to 1¾ in. The uniform quality of Bethlehem plates makes them ideally suited for fabricating weldments; the use of these plates, plus proper welding technique, gives assurance of sound welds. Bethlehem plates come in a full range of sheared and universal mill sizes.

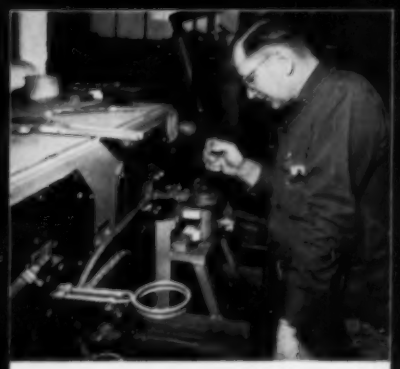
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

JACK & HEINTZ Saves $15.84 per hour...



Jack & Heintz Inc. silver brazes over 25 different parts on this 15 KW, 10,000 cycle TOCCO machine.

with TOCCO* Induction Brazing

Brazing Costs Down

When Jack & Heintz engineers switched from torch brazing to automatic induction, brazing cost of these inverter brush mounts fell from $.05 to $.006 each —a reduction of 83% in direct labor costs alone! Additional savings result because less cleaning is required after TOCCO, and fuel costs are much lower, too.

Brazing Production Up

While costs dropped, production on the part zoomed —from 40 to 360 brazed assemblies per hour. Furthermore, rejects and scrap, formerly high, are now negligible.

Versatility

The part shown is just one of over 25 parts, large and small, which alert J & H engineers have converted from old-fashioned brazing methods to modern, automatic TOCCO. Overall brazing costs (TOCCO brazing versus former methods used) are down 75%—brazing speed, up 100%.

* * *

If the manufacture of *your* product involves brazing, heat-treating, forging or melting of ferrous or nonferrous metals, don't overlook TOCCO as a sound method of increasing production, improving product quality and slashing costs.

THE OHIO CRANKSHAFT COMPANY

TOCCO

Mail Coupon Today

NEW FREE BULLETIN

THE OHIO CRANKSHAFT CO.
Dept. S-12, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Brazing and Soldering".

Name_____

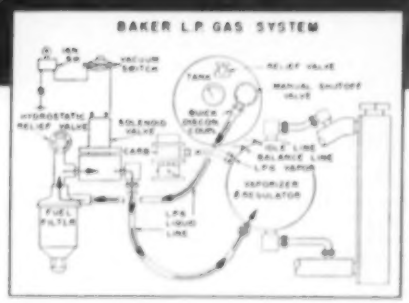
Position_____

Company_____

Address_____

City_____ Zone____ State_____

BAKER *offers LP gas fork trucks in 2000 to 7000 lb. capacities*



Arrows trace the flow of LP gas from the tank through the filter to the vaporizer and regulator before it enters the engine. The hydrostatic relief valve opens the system before dangerous pressure is reached in event of high ambient temperature changes. Automatic fuel shut-off is provided by solenoid valve and vacuum switches when engine stops. For maximum efficiency, the vaporizer preheats the LP gas before it passes to the regulator and the regulator reduces the pressure before the gas enters the carburetor.

The complete Baker line includes the BAKER LP gas fork trucks for those desiring the cost savings, cleaner operation, and other advantages provided by liquefied petroleum gas.

The Baker LP gas truck is powered by an engine specially designed for LP gas, not just a conversion unit. The special LP engine is provided with high compression head for maximum efficiency. Among the features are a special cold manifold and hot thermostat for cooler operation. Stellite-faced exhaust valves and solid Stellite inserts assure greater dependability and longer life. Complete vaporization and more efficient combustion mean lower oil consumption, less down time and reduced maintenance costs due to minimum cylinder wear. Fuel tank conveniently located behind the driver can be removed and full tank installed in less than a minute.

Write for information.

Baker handling equipment

THE BAKER-RAULANG COMPANY

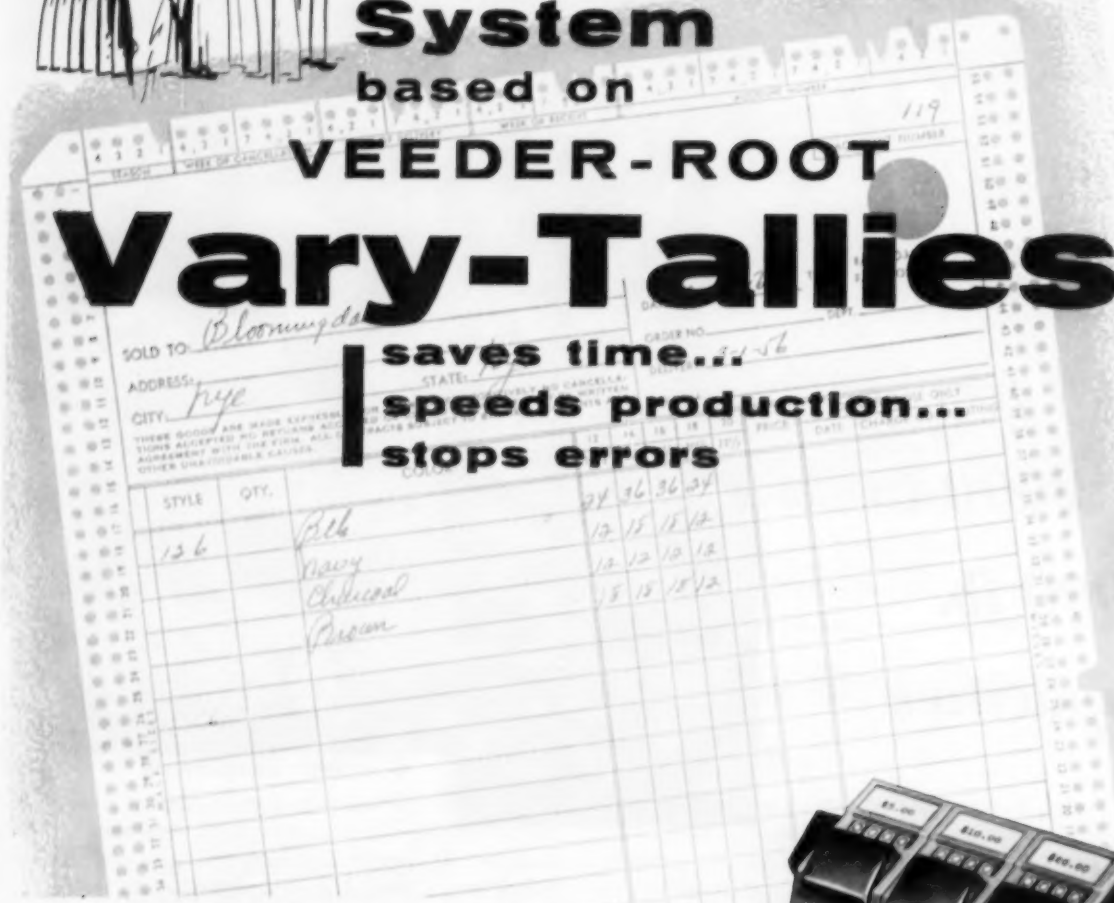
1259 WEST 80th STREET • CLEVELAND 2, OHIO

A subsidiary of Otis Elevator Company

604

NEW Stock-Control System based on VEEDER-ROOT Vary-Tallies

saves time...
speeds production...
stops errors



Manufacturers of skirts (or skis) can speed and simplify their stock-keeping, accounting, and payroll records with simple punched-card systems based on Vary-Tallies. A leading skirt-maker, for instance, always has complete command of several variations of styles, sizes and colors simply by lifting out the cards for any of these classifications . . . and recording them on the Vary-Tally. This gives him an instant accounting on any account, without pencil tallies, scratch marks, or telltale marks on the goods.

In time-checking, this manufacturer has tallied 420 items on 80 orders in 4½ minutes. *His best previous time was 40 minutes.* No copying . . . nothing but the final totals on the counter-faces.

What Production Systems Inc., Waltham, Mass., is doing for the garment industry with its "Quik-Pik" System . . . *you* can do for yourself with a similar system based on Vary-Tallies. And you can count on Veeder-Root to help you. Write:

Hartford, Conn. • Greenville, S. C. • Chicago
New York • Los Angeles • San Francisco • Montreal
Offices and Agents in Other Principal Cities

VEEDER-ROOT INC.
"The Name that Counts"

In This Issue

STEEL The Metalworking Weekly

December 17, 1956 Vol. 139 No. 25

☑ 47 **Metalworking Outlook**—Look Out for the Second Half!

☑ 51 **Editorial**—Problems of Prosperity

53 Appliances: Steady Growth in 1957 for Staple Models
55 Underground Plants: Not Many Will Be Built
56 U.S. Chamber of Commerce Business Forecast for 1957
57 Industrial Expansion Means Gains for Steel Flooring
59 NAM Sees New Dimensions for America

☑ 60 **Windows of Washington**—Elephant Tool Program

63 Management at Work—L-R Heat Treating's Rizzo
64 Outlook for Britain and France—Part II of a Series

☑ 67 **Mirrors of Motordom**—STEEL Covers N.Y. Auto Show

☑ 71 **The Business Trend**—Industrial Production Hits Record

75 Men of Industry—News About Men You Know

☑ 85 **Technical Outlook**—Adhesives Replace Rivets

86 Soldering Keeps Up to Date
91 Manufacturing Under a Microscope
92 Lathe Speeds Up Jet Engine Disc Output

☑ 94 **Progress in Steelmaking**—Magnetic Rolls Cut Crop Loss

96 Roof Ventilators Solve Space Problem
98 Throwaway Cutters Gain
100 Titanium Extruders Ready for Volume Business—Part II
107 New Products and Equipment
116 New Literature

☑ 119 **The Market Outlook**—Steel Continues Under Forced Draft

129 Price Indexes and Composites
131 Steel Prices—Ores, p. 138
141 Scrap Market Trends—Prices, p. 142
144 Nonferrous Metals
146 Nonferrous Metal Prices
149 Advertising Index

Behind the Scenes, p. 6; Letters, p. 10; Staff, p. 16; Meetings, p. 27; Index available semi-annually. STEEL also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

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what's the scoop?

it's SEYMOUR NICKEL SILVER of course!

Take a close look at one of the "scoops" — or hooks — in the slide fasteners which play a key role in your daily living.

The *best* slide fastener scoops are made of Seymour Nickel Silver wire. They are formed on high speed machines that produce up to 300,000,000 tiny parts every day. Yet, so precise is the operation that tolerances are held to half-thousandths of an inch!

Because its uniform composition and temper enable it to undergo precise forming on high speed machines, Seymour Nickel Silver meets these requirements perfectly. It will not discolor materials — it is long wearing and corrosion resistant — it has the necessary eye appeal. Best of all, it has the *natural lubricity* which makes fasteners work smoothly and without sticking. These enviable qualities have helped make Seymour the leading supplier of nickel silver wire for the slide fastener industry.

Beyond that, Seymour's readiness to produce nickel silver alloys in strict conformity to users' needs has prompted many manufacturers to say . . . "SPECIFY SEYMOUR — You KNOW it's good!"

SEYMOUR

THE SEYMOUR MANUFACTURING CO.
3 Franklin Street, Seymour, Connecticut

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THE CRAYONS THAT TELL TEMPERATURES

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- **Select appropriate TEMPILSTIK° for the working temperature you want.**
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Accuracy within 1% of rated melting point.

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behind the scenes

Reliance on Appliances

A fer-de-lance is a viper, and if it were black instead of yellow, it would look like the scary cover art designed by George (Tiger) Farnsworth to promote STEEL's annual report on major appliances (page 53). When the Tiger brooded over his assignment, and finally came up with his extension cord design, he had no idea it would resemble a fer-de-lance. "Appliances," he explained, "have to have cords, and any resemblance between this cord and serpents is purely coincidental. Now, as for editors . . . ." We hastened to quiet the honest genius because the war between artists and editors is never ending.

Forgetting reptiles, artists and editors for a moment, consider the sales prospects for appliances in 1957. When you think you have the answers, turn to STEEL's report. You're going to be surprised, friends—happily surprised, particularly if you have any interest in the major appliance business.

Shake Hands with Cupid

That flash comparison above between editors and serpents reminds us that we have been called many things by many persons, ranging from biological absurdities to sarcastic impossibilities, but we never dreamed we would ever double for Cupid. In testimony whereof, we submit a wedding invitation from a happy couple whom we innocently prodded toward matrimony.

During the summer (STEEL, June 18, July 9, Aug. 27) we ran a contest to determine if our readers could match wits with our artists in the matter of selecting superior ads from a given issue of STEEL. The winning entry came from Philip Edward McCafferty, of Stanwood, Iowa, who mentioned in passing that he and his lady could scarcely wait for the free dinner we promised. With our check went a letter expressing the hope that Mr. and Mrs. McCafferty might enjoy themselves (if you will pardon the expression) to the full.

Mr. McCafferty wrote to explain that the lady wasn't his wife, but that when he showed her the letter "she made a number of sneaky little remarks about this Mrs. McCafferty stuff."

Time, as they say, marched on, and love flowered in the corn country. It culminated in an announcement we received last week from Mrs. Lyle E. Clark, of Monticello, Iowa, requesting the honor of our presence at the marriage of her daughter, Lucille Elizabeth, to (you guessed it) Philip Edward McCafferty, on Saturday, Dec. 22.

We appreciate the invitation and regret that we cannot attend, but as far as best wishes go, let's go whole hog, and extend congratulations from the Penton Publishing Co.

More About Goya

It's pleasant and refreshing to receive correspondence from the polite and intelligent persons who do us the kindness to read this page. Herbert B. Trix, president, W. M. Chace Co., Detroit, sends some addenda on the Goya business that appeared here on Nov. 12.

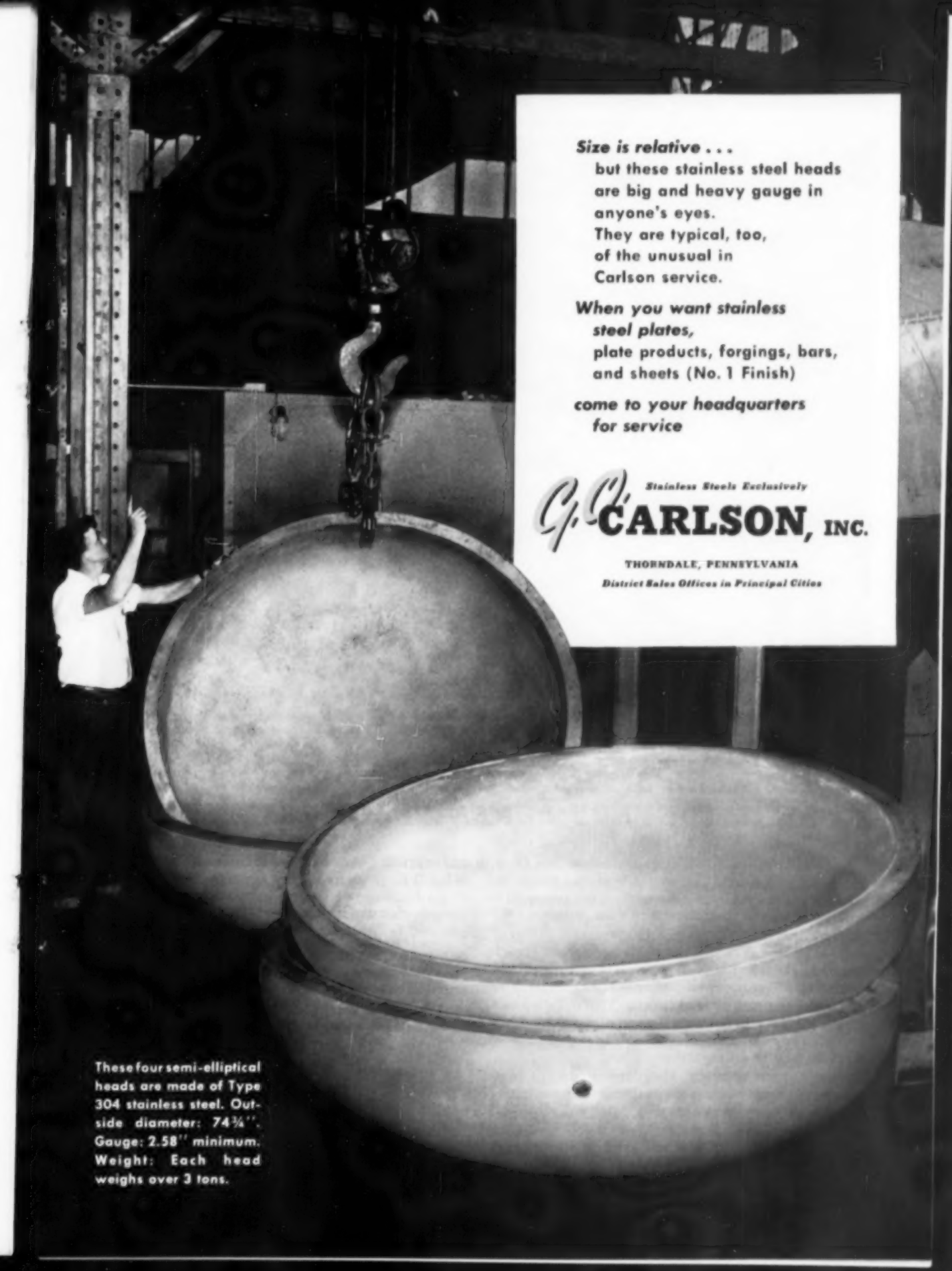
"The Duke of Alba," he writes, "learned that Goya was painting a nude portrait of the Duchess, so he planned to run the artist through with his trusty sword. Goya learned about the threat and hastily painted another portrait of the Duchess reclining on the same sofa, but fully clothed in a black lace dress, with the same rose behind her ear. When the Duke arrived ready for mayhem, this was the picture shown to him, and all was well. Both pictures are now on display in the Prado in Madrid, and are a source of considerable irritation to the Alba family, which in Spain, outranks and takes precedence over everyone, including the king."

Mr. Trix's company produces thermostatic bimetal, so he's bound to be an authority on units that offer a double behavior.

Thermostatic bimetal; really wonderful stuff. How do you suppose it came to be invented? (This should bring in a letter or two, which we can pass on to all who are interested.)

Shrdlu

(Metalworking Outlook—Page 47)



Size is relative . . .
but these stainless steel heads
are big and heavy gauge in
anyone's eyes.
They are typical, too,
of the unusual in
Carlson service.

When you want stainless steel plates,
plate products, forgings, bars,
and sheets (No. 1 Finish)

come to your headquarters for service

Stainless Steels Exclusively

C. O. CARLSON, INC.

THORNDALE, PENNSYLVANIA

District Sales Offices in Principal Cities

These four semi-elliptical heads are made of Type 304 stainless steel. Outside diameter: 74⅜". Gauge: 2.58" minimum. Weight: Each head weighs over 3 tons.

WELDMENTS for strength, lightness, predictability and design freedom—at lower cost!

DIESEL ENGINE FRAME: Weldments of this type have been responsible for weight savings as high as 32% with no sacrifice in strength and safety. Superior shock resistance protects engine performance. Maintenance costs are reduced and significant economies realized.

HERE'S THE STORY OF QUALITY BEHIND EVERY LUKENWELD WELDMENT

Lukenweld's extensive production facilities and experience add up to this: no matter how big, tough, or challenging the job, you get exactly what you want—on time—and at a cost that will fit your plans.

DEPENDABILITY The predictability and rigidity of welded structures plus Lukenweld's specialized knowledge of design and materials selection assures equipment that will perform efficiently, longer.

RELIABLE SOURCE OF MATERIALS Carbon, alloy and clad steel plates in the widest range of types and sizes available anywhere are obtainable "right next door"—from the Lukens rolling mills.

CONSULTATION SERVICE Metallurgical, design engineering, related services are available on your job.

FINISHING FACILITIES Modern heat treating, machining and other finishing facilities are your assurance of complete quality control from steel plate to finished weldment—ready for assembly in your equipment.

EXPERIENCE Lukenweld, the first commercial weldery in the U.S., pioneered many advances in welded construction. Knowledge and craftsmanship gained through this experience make Lukenweld unusually qualified to meet your weldment needs.

FOR INFORMATION on how Lukenweld can answer your particular weldment problems or for a copy of the informative booklet, "Weldments by Lukenweld," write on your company letterhead to Manager, Marketing Service, 819 Lukens Building, Coatesville, Pa.

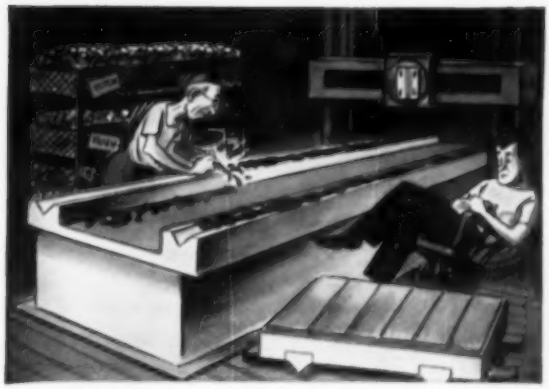
LUKENWELD LUKENS

A DIVISION OF LUKENS STEEL COMPANY
COATESVILLE, PENNSYLVANIA

1. Cures "stick-slip" or "jumpy table". When a table gets the "shakes", especially after it has just reversed or when the load is heavy and the speed slow, it's probably suffering from "stick-slip". Remedy—Sunoco Way Lubricant®. Special polar compounds in Sunoco Way Lubricant form a friction-reducing film that keeps a table sliding smoothly under all operating conditions.

2. Doesn't squeeze out. When you use a heavy oil as a way lubricant, you must use a lot of oil to maintain a thick enough film. But, heavy oil squeezes out if the table sits in one position very long. You have a tough time getting the table moving again. Protected by the tenacious thin film formed by Sunoco Way Lubricant, the machine can be idle for a week and it will start easily.

WHY SUNOCO WAY LUBRICANT CAN HELP CURE YOUR MACHINING PROBLEMS



3. Protects expensive ways. Badly scored or pitted ways, caused by inadequate way lubrication, result in lost production and expensive repairs. The high film strength of Sunoco Way Lubricant eliminates the danger of metal-to-metal contact, the chief cause of scoring and way wear. Excellent metal-wetting and non-corrosive properties eliminate rusting and pitting.

For the lubrication of slides
and ways on this machine,
we recommend the use of
SUNOCO WAY LUBRICANT
a product of
SUN OIL COMPANY

4. Approved by more than 55 machine-tool builders. Every major machine-tool builder has tested Sunoco Way Lubricant. It is always approved. In fact, to assure maximum efficiency of their product, many manufacturers ship a supply of Sunoco Way Lubricant with each machine. We'll be glad to send you the list of manufacturers who have approved Sunoco Way Lubricant.

For more information, see your Sun Representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-12.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA. SUN OIL CO.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO and MONTREAL

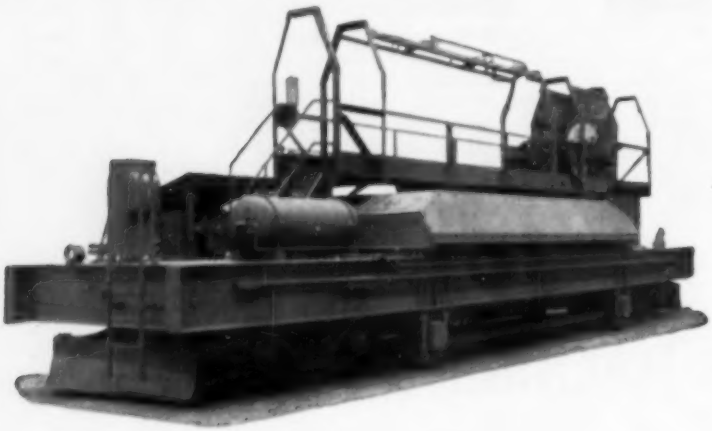
SUNOCO®

STOCK HOUSE OR HIGH LINE

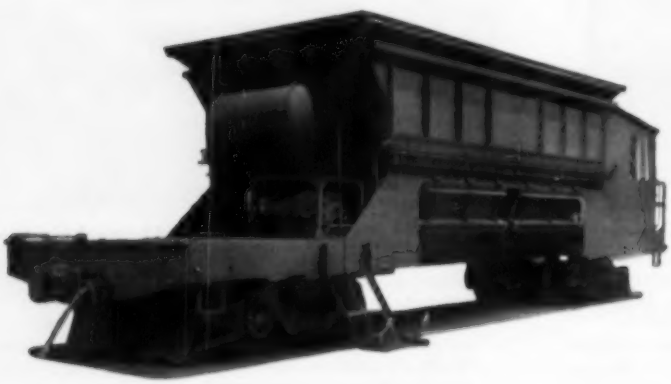
operators prefer the

DEPENDABILITY OF ATLAS CARS

These specially designed units are another example of the ruggedness of Atlas Cars. Their dependability helps maintain the most rigid furnace charging cycles.



40-TON SCALE CAR
Double Hopper Bottom Dump



75-TON ORE TRANSFER
Gable Bottom Double Side Dump

THE ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Importance of Construction

The staff of the Associated General Contractors of America—and, I'm sure, leaders in the construction industry—were pleased with the article, "Construction Sets the Pace" (Nov. 5, page 65). We are no less grateful for your timely editorial, "Building America" (page 63).

You have performed an invaluable service to the construction industry in presenting a picture of the importance of construction to the national economy and as a consumer of steel.

William G. Dooly Jr.
Public Relations
Associated General Contractors of America Inc.
Washington

Good Reporting

Please mail a copy of the article, "Wage Differential Maze: Where's Escape?" (Oct. 22, page 45). It covers a complex and confusing subject with remarkable simplicity and clarity. A wonderful example of good reporting.

Robert L. Egbert
Acting Personnel Manager
Dixon Sintaloy Inc.
Subsidiary of Joseph Dixon Crucible Co.
Stamford, Conn.

Timely Atomic Article

Please send two copies of the article, "Atomic Business . . . How You Can Get It" (Nov. 19, page 142). Thank you for publishing an article of such immediate interest.

Martin M. Sternfels
Chemical Engineer
Chromium Corp. of America
Waterbury, Conn.

Praise to Depreciation Article

Congratulations on the article, "Self-Help on Depreciation" (Nov. 19, page 99). This simple, clear article is not only helpful but also points out a critically important consideration greatly neglected by industrial management.

Tell Berna
National Machine Tool Builders' Association
Cleveland

Great Service to Colleges

The article, "Industry and College: Partners in Development" (Nov. 12, page 119), is an excellently prepared article. It covers all facets of industry aid to education.

You are doing a great service to colleges throughout the country.

I was pleased to see the paragraph relating to the Utica Drop Forge Scholarship program at Hamilton. I think you might be interested to know

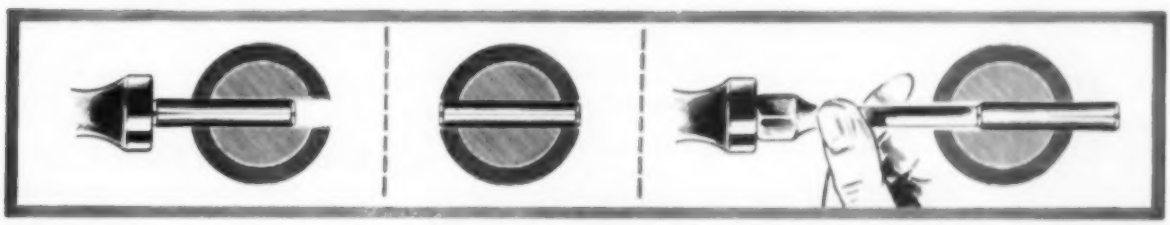
(Please turn to page 12)

what makes this fastener DIFFERENT?

Several things. Rollpin® is a slotted, chamfered, cylindrical spring pin which drives easily into a hole drilled to normal production standards. It locks securely in place, yet can be drifted out and reused whenever necessary. This eliminates special machining, tapping, and the need for hole reaming or precision tolerances. Rollpin replaces taper pins, straight pins and set screws; for many applications it will serve as a rivet, dowel, hinge pin, cotter pin or stop pin.

And here's another difference that makes Rollpin the quality fastener in the field: ESNA's quality control builds consistent strength and performance into every Rollpin. Rollpin is uniform as to shear strength, dimensions, hardness, and insertion and removal forces.

HOW YOU INSERT IT



Drives easily by hammer, arbor press, or air cylinder and can be readily adapted to an automatic hopper feed. Requires only a standard hole, drilled to normal production-line tolerances.

Locks securely in place without using a secondary locking device; won't loosen despite impact loading, stress reversals, or severe vibration.

Removes readily with a drift pin without damage to pin or hole, can be used again and again in original hole.

HOW YOU SAVE

You pay less for Rollpins than for most tapered, notched, grooved or dowel pins. Installation costs are substantially less than for any fastener requiring a precision fit or secondary locking operations.

Because of their tubular shape, Rollpins are lighter than solid pins. Production maintenance is reduced with Rollpins: they do not loosen and because of their spring action they tend to conform to the drilled hole in which they're inserted, without material hole wear, eliminating the necessity of re-drilling or using oversize pins.

MATERIALS AND SIZES

Standard Rollpins are made from carbon steel and Type 420 corrosion resistant steel. They're also available in beryllium copper for applications requiring exceptional resistance to corrosive attack, good electrical, anti-magnetic, and non-sparking properties. Stock sizes range from .062" to .500" in carbon and stainless steels.

ROLLPIN®

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA

Dept. 840-1260, 2330 Vauxhall Road, Union, New Jersey

Please send me the following free fastening information:

- ☐ Rollpin Bulletin
- ☐ Elastic Stop nut Bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name _____ Title _____

Firm _____

Street _____

City _____ Zone _____ State _____

Foote
MINERAL COMPANY
Electromanganese
99.9+%
NOW UNITED FOR NEW ADVANCES IN METALLURGY!
As industry's needs are created, science must have the answers ready . . . and our recent acquisition of Electromanganese Corporation now combines the research and production facilities of these two famous names — and provides an even more complete service to the metallurgical industry.
Production capacity is now being expanded to supply the unprecedented demands for high-purity, low-cost ELECTROMANGANESE® — the key to superior quality manganese stainless steels — and its companion product, NITRELMANG®, a fume-free consistent nitrogen source for stainless and resulfurized, pre-machining grades of steel.
These two products are available in unlimited quantities to help you capitalize to the fullest on the tremendous growth of stainless and other alloy steels.
And other great products . . . other pace-making developments . . . are on the way!
Technical assistance from our research engineers, or information about our products, is yours for the asking. Write us about your metallurgical problems.
Foote
MINERAL COMPANY
1257 Eighteen West Chelten Building
Philadelphia 44, Pa.
RESEARCH LABORATORIES: Berwyn, Pa.
PLANTS: Eaton, Pa.; Kings Mountain, N. C.; Knoxville, Tenn.; Sunbright, Va.

LETTERS

(Concluded from page 10)

that when scholarship recipients were being selected by our admissions people and by the company, Utica Drop Forge could not decide between two sophomores. So it gave each a scholarship. As a result, we have four boys holding these scholarships this year.

Herbert C. Hansen
Assistant to the President
Hamilton College
Clinton, N.Y.

Way To Get Engineers

Please send a reprint of the article, "I Have Enough Engineers" (Nov. 12, page 130). We found this article most interesting and would like it for further study and distribution.

J. M. Howard
Assistant Chief Engineer
Inland Steel Co.
East Chicago, Ind.

Enlightening Series

Please send a copy of the article, "Motivating Men To Produce More" (Sept. 24, page 105). Your 1956 Program for Management is both comprehensive and enlightening.

Russell B. Lamb
Plant Facilities Specialist
Specialty Transformer Department
General Electric Co.
Ft. Wayne, Ind.

Please send a copy.

The 1956 Program for Management series provides valuable and practical information, and your service is much appreciated.

Paul Autio
Process Engineer Supervisor
Shakeproof Division
Illinois Tool Works
Elgin, Ill.

Standardization Program Aid

We would appreciate a copy of the Metal Selector insert in your Oct. 1 issue. It will be of considerable assistance to us in our materials standardization program.

J. T. Thompson
Standards Engineer
Food Machinery & Chemical Corp.
San Jose, Calif.

Conversation Piece

I have just read the article, "Metalworking Tackles the Satellite" (Oct. 15, page 120). I enjoyed it a lot, and since it will be a topic of conversation in the near future, I would appreciate a copy.

R. C. Robinson
1814 Robin Road
North Augusta, S. C.

Mistake in Geography

While your magazine is informative on subjects concerning metallurgy, it seems to be misleading in geography. Your headline for the illustration on page 48 of the Sept. 3 issue reads: Aluminum Oil Piping for India. The caption says this piping is being shipped to Karachi, Pakistan.

It would be equivalent to writing your address as Penton Bldg., Cleveland, O., U.S.A., Mexico. Pakistan and India are independent countries.

M. A. Rashid
Essen-Bredeney
Narzissenweg 9
West Germany

"We find Norton discs outproduced others—2 to 1"

One of many job reports showing how Norton discs add the profit-boosting "TOUCH of GOLD"

MORE OF THE SAME:

- "Norton discs the best ever received. Produced over 6,000,000 piston rings — 100% more than our former discs, with 50% less dressing. Results duplicated in subsequent shipments."
- "Outlasted and outperformed all other discs. Gave 366,975 pieces without burn."
- "Averaged 21,500 pieces, a new high for this job."
- "High above competition for output and grinding quality."
- "Gave 20% longer service life."

What Norton discs have done for others, they can do for you.

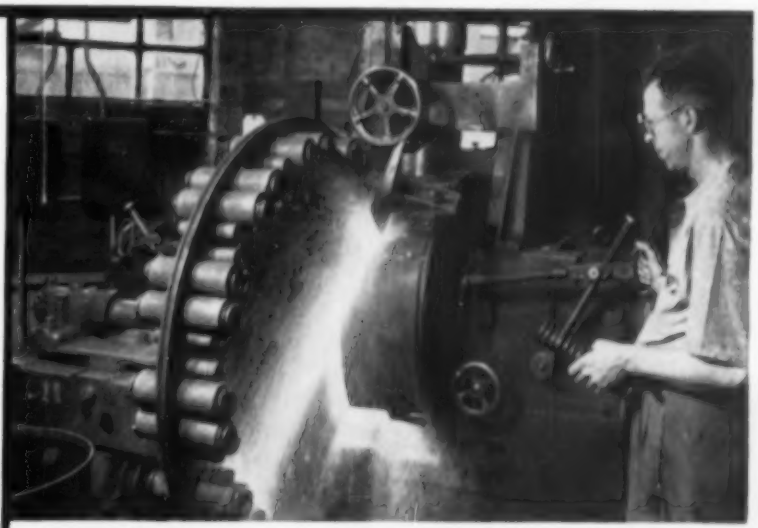
That goes for any material you're grinding, on any type of disc grinding machine.

Norton discs of ALUNDUM* and CRYSTOLON* abrasives are made in all standard grit sizes, all grinding grades, five types of bonds and all types of mountings. They are precision-built for closest uniformity — so you can depend on the same cool cutting action and extra long service life every time you re-order.

See Your Norton Distributor

for valuable aid in selecting the right discs for your jobs. Ask him for the booklet, *Disc Grinding*. Or write to the nearest district office of NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. Behr-Manning Company, Troy, N. Y., division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1725



HEAVY STOCK REMOVAL with precision tolerance on this double spindle disc grinder is a faster, easier job when a Norton disc adds the "Touch of Gold." Norton covers the entire range of disc grinding applications, from snagging to lapping.

LAPPING ENDS OF TRANSFORMER COILS on a Norton 60-F HYPRO-LAP* lapping machine equipped with a Norton disc. Only Norton offers you such long experience in both grinding wheels and grinding machines to help you produce more at lower cost.

NORTON
ABRASIVES

Making better products... to make your products better

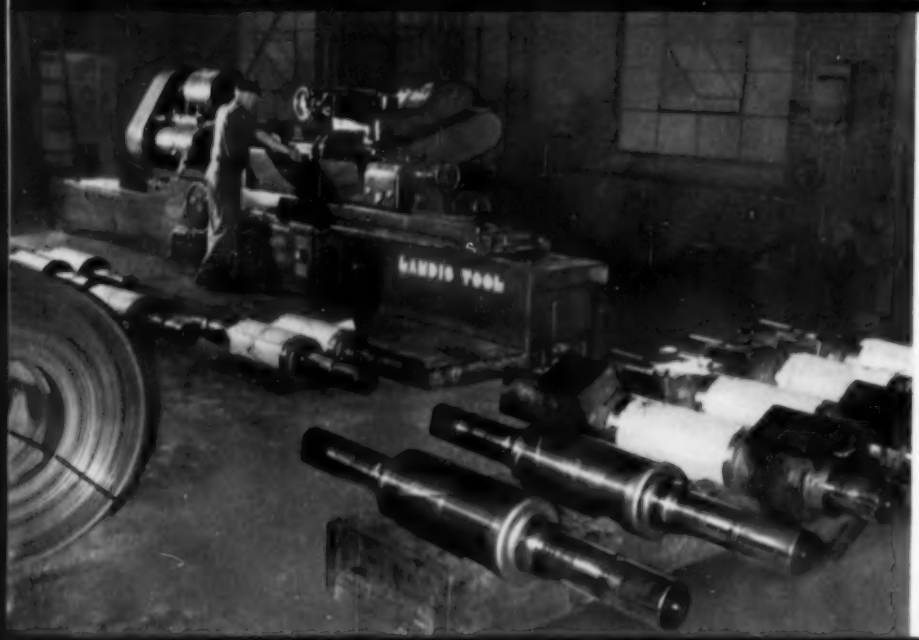
NORTON PRODUCTS: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING PRODUCTS: Coated Abrasives • Sharpening Stones • Behr-cat Tapes

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

Fast, accurate roll grinding from

You can get results like these from Landis precision features

Mirror finishes like this are the result of combining rigid heavy machine parts, smooth vee belt drives, and Landis Microsphere Spindle Bearings.



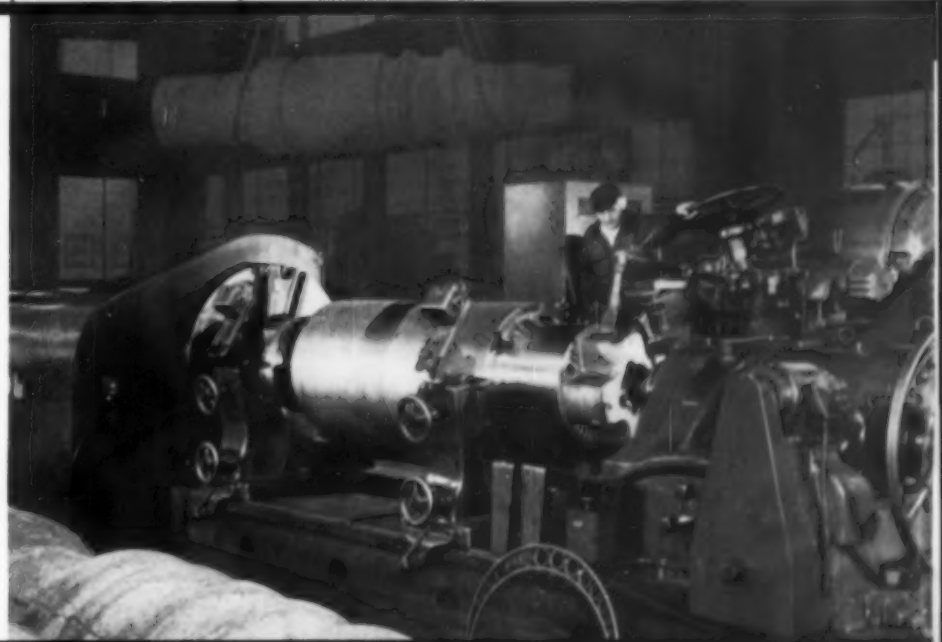
Easily duplicated, accurate roll contours, from the Landis crowning and concaving mechanism. Ease of adjustment reduces setup time and eliminates cut and try methods.

LANDIS TOOL COMPANY / WAYNESBORO, PENNSYLVANIA

the Landis line of *precision* machines

Condensed specifications	Sine Bar Roll Grinder	Type FR Roll Grinder	Type B Roll Grinder	Type 30 Roll Grinder
Work swings	10" & 14"	18" & 24"	20"-24"-28"	36"-44"-50"-60"
Distances between centers	48" to 72"	72" to 240"	96" to 192"	120" to 288"
Standard grinding wheel size	14" x 1½"	30" x 3"	30" x 3"	36" x 4"
Work drive motor hp	1 hp	3 hp	7½ hp	36"-44" 20 hp 50"-60" 30 hp
Wheel drive motor hp	3/5 hp	25 hp	30 hp	40 hp

Ample power to start any roll within the capacity of the machine. Landis heavy beds and massive construction permit rough or finish grinding on all types of rolls.



LANDIS
precision grinders

FILL OUT COUPON FOR FACTS, SAMPLES!

ALUMINUM COMPANY OF AMERICA
2250-M Alcoa Bldg., Pittsburgh 19, Pa.

Gentlemen:
Please send complete specification data and samples of your aluminum fasteners.

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Title _____

Company _____

Address _____

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Everywhere you look in metalworking shops, chances are you'll see strips of ALOXITE® Metal Cloth being used. Your operators simply tear off the strips in any length they need—and you save money because there's less waste. These tough, flexible, general purpose ECONOMY® Rolls do so many jobs so quickly and so well, too! You get superior results on light maintenance and touch-up work and on production jobs involving roughing, blending, deburring, finishing or polishing. The handy 50-yard rolls come in widths from ½" to 2", in grit sizes from 24 to 500. Rolls are mounted on plastic spools for hanging on any convenient nail or dowel. Stock up on these popular, handy ECONOMY Rolls today. Call your CARBORUNDUM Distributor or salesman for prompt, dependable service. Or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

Through application "know-how" and product quality

CARBORUNDUM

REGISTERED TRADE MARK

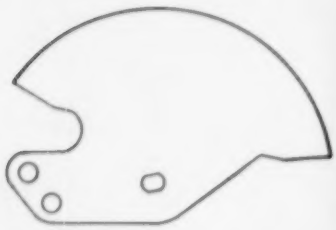
continually puts more sense in your abrasive dollar

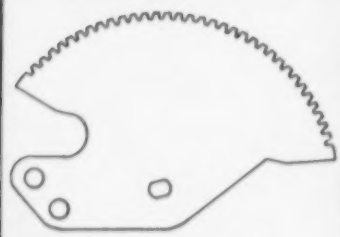
ANOTHER *American* FIRST

Involute teeth broached in 1200 pieces per hour

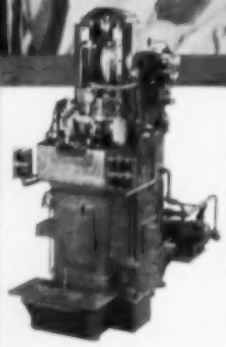
. . . 10 PARTS AT A TIME!

Part before broaching





With involute teeth broached



An indexing fixture, equipped with two loading stations and automatic clamping, is mounted on an American 3-way machine to perform this specialized high production broaching operation. While one station is broaching, the operator stacks 10 parts at the other station. The stack is automatically indexed into broaching position and then clamped. At end of the broaching stroke, the stack is indexed and discharged into a chute by an automatic air ejection unit.

The low piece cost obtained on this machine, is an example of the economies that American gives you — by supplying a machine completely tooled with work-holding fixtures and broaches.

Why not put American to work on *your* broaching problem. A parts print or sample will receive prompt attention. Or write for catalog 450. It is an informative manual on all phases of broaching.

AMERICAN *American* BROACH & MACHINE CO.

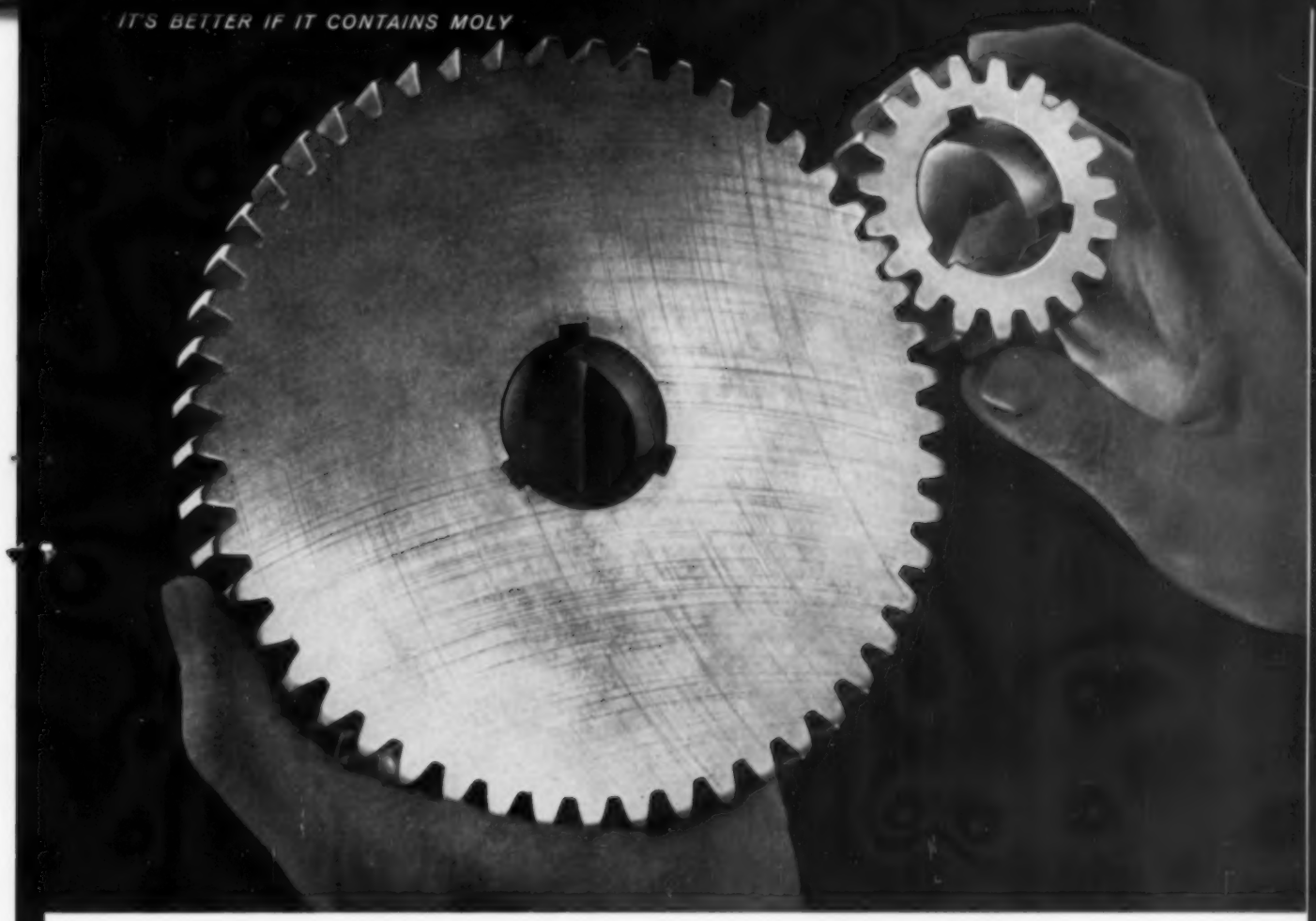
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

SUNDSTRAND

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

IT'S BETTER IF IT CONTAINS MOLY



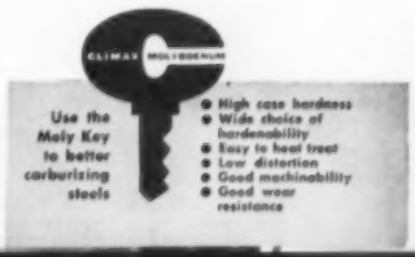
Up to 1% Moly in carburizing steels gives required hardenability economically

Why limit the use of molybdenum to the .15/.25% Mo and .20/.30% Mo contents of the traditional grades? For the contributions of moly do not stop there. Laboratory tests and production runs prove that as molybdenum contents increase up to 1%, hardness increases progressively. A wide range of case and core hardenabilities, therefore, can be obtained – economically, too.

Tests with a series of molybdenum-manganese steels show that these compositions give higher case hardness on a direct quench than other steels of comparable core hardenability. One extensively tested composition, for example, is 0.5% Mo – 0.5% Mn steel. It shows longer life, and is lower in cost than steels previously used. And it produces a higher case hardness with similar or less distortion. What's more, tool life and surface finish are equal or better. Good reasons why several companies have already adopted this grade for automotive gears and other critical applications.

If you use carburizing steels, see what a higher molybdenum content can do for you. Part of the story is contained in the technical article "New Carburizing Steels For Critical Gearing." For your copy, or other technical data, write Climax Molybdenum Co., Dept. 3, 500 Fifth Avenue, New York 36, N. Y.

CLIMAX MOLYBDENUM



Mr. Smith goes to Florida

Mr. Smith's books showed an excellent current ratio. His cash position was good; his surplus was substantial. Shortly thereafter, however, he entered a premature retirement.

He had overlooked the fact that a large part of his company's fixed assets were machine tools, and their values shown on his balance sheet were simply bookkeeping entries. Those values didn't reflect obsolescence, nor show how expensive indirect labor, nonproductive floor space and downtime can be.

A closer look at your balance sheet may reveal the wisdom of investing in new production equipment. Its high rate of return makes good balance sheets better.

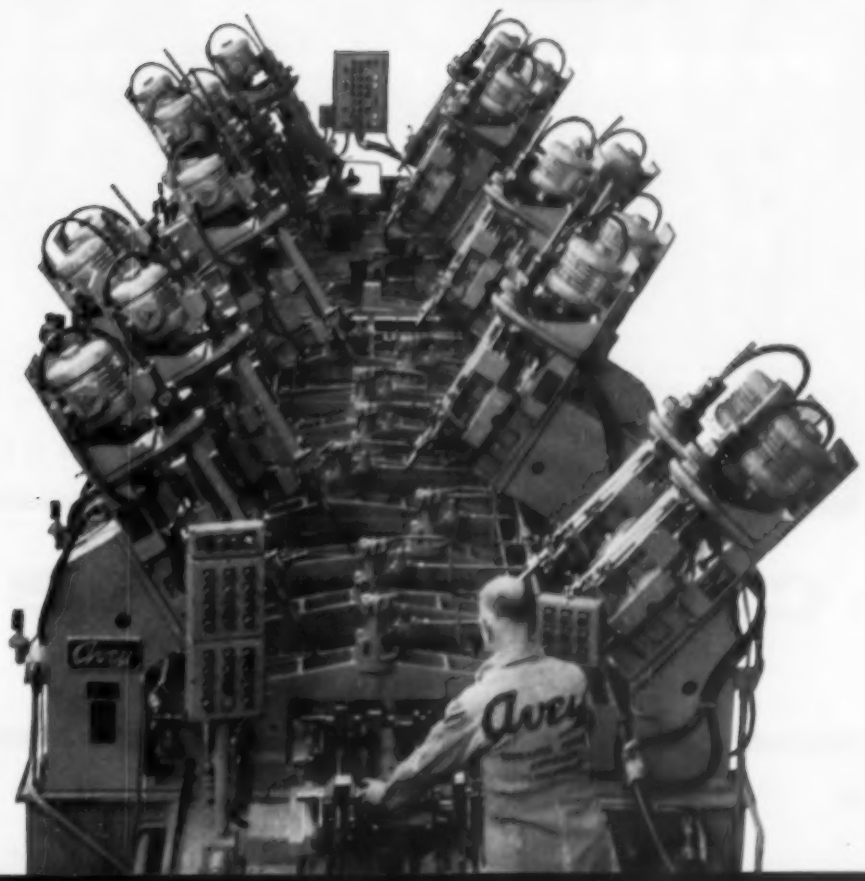
The 14-station machine has Line-O-Dex indexing, automatic hydraulic clamping and positioning, and drills ¼" holes with Aveydraulic Torquematic deep hole drilling units.

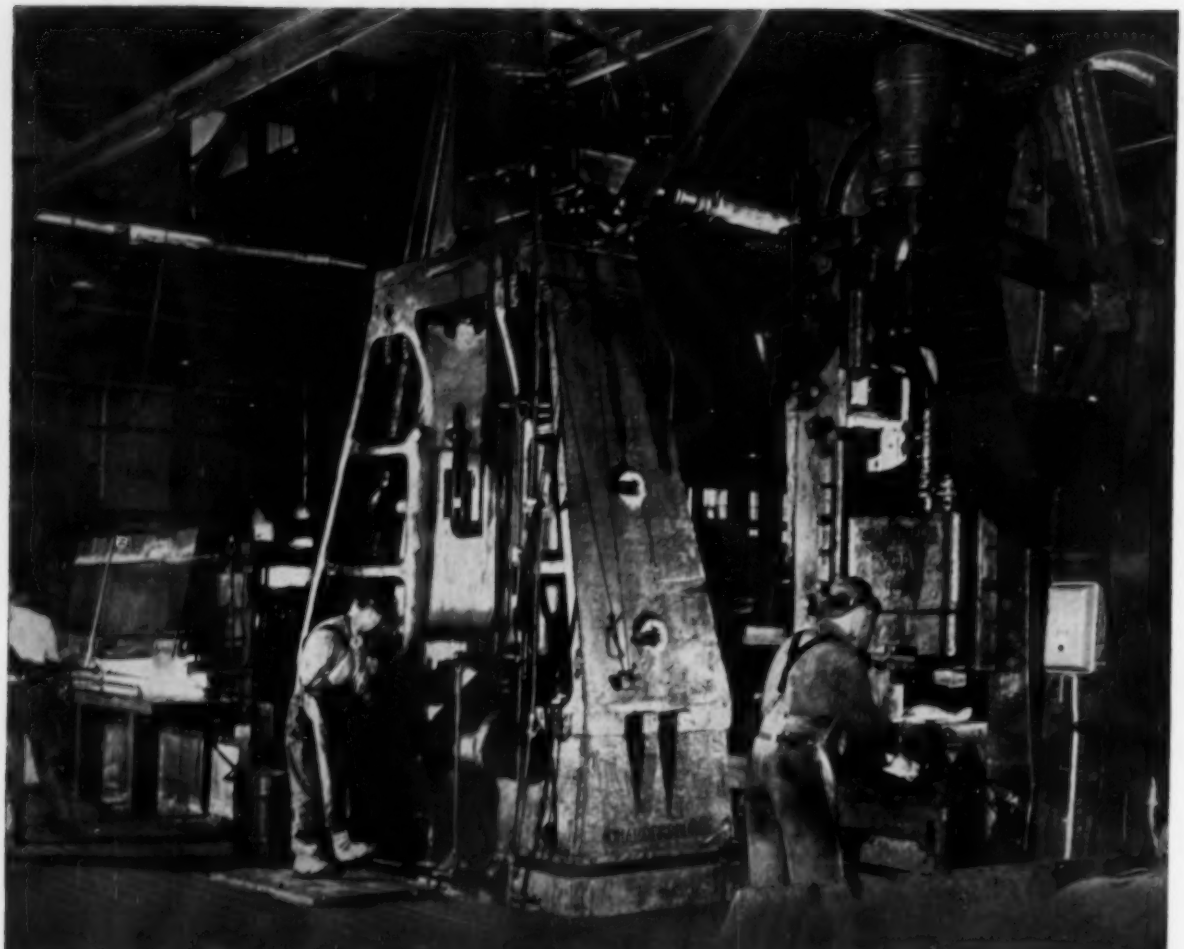
When this order is complete, or the part changes in design, the Avey standard units can be rearranged for a new job ▶ *an economical way to extend the life of your investment.*

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

drilling, tapping, production machines

Avey





Production Increased 30%

Shown here is a 6000 lb. Chambersburg Steam Drop Hammer and a No. 200 Chambersburg Steel Side Trimming Press installed in a forge shop specializing in railroad car parts, gear blanks and general job forging. A 2000 lb. hammer and a No. 100 Trimmer are also installed. Hammers operate on air.

In replacing older hammers, the Chambersburgs were selected for the accuracy and quality of their manufacture. Experience to date shows maintenance costs are lowered, rejects are fewer, less down time is required, and as a result management figures production is up 30%!

If you are interested in getting similar results in your own shop, write for a copy of Bulletin 55-L-4.

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

CHAMBERSBURG

"THE HAMMER BUILDERS"

An Even Better DIMENSIONAIR

WITH THE SAME BASIC, *NO-DRIFT* SYSTEM

ONLY AIR GAGE WITH BUILT-IN ACCURACY THAT ENABLES USE OF ONE MASTER

BETTER FILTER with TRANSPARENT BOWL

New sintered bronze element filters out dirt and coagulated oil. Condition of air lines can be readily checked by observing filter bowl. Attached directly to gage, it eliminates extra piping.

ALL COMPONENTS EASILY ACCESSIBLE

One-piece top and front easily removed with all components and connections attached. Quick, easy servicing, if necessary.

The Dimensionair system is basically sound in principle. Its accuracy is proved constant and dependable every day in practice.

Now, new important refinements have been built into the Dimensionair which further improve its use.

Most air lines installed in plants were NEVER INTENDED to be used for precision instruments of any kind. Hence, the Dimensionair is now made EVEN MORE IMMUNE to unclean air and variations in air pressures.

Adjustments are more foolproof.

Smaller size makes the gage EASIER TO HANDLE and increases its adaptability for general use . . . and for multiple use.

Since any instrument is subject to all degrees of treatment it must be EASY TO SERVICE when the unusual or unexpected upsets its normal function. In the new and smaller Dimensionair all components and connections are quickly and easily accessible.

In every way the Dimensionair provides you with constant accuracy and GREATER DEPENDABILITY, adaptability and service. That's why more and more inspection people buy it. Why don't YOU try it? Write or call us or our nearest office.

FEDERAL PRODUCTS CORPORATION
62112 Eddy Street, Providence 1, R. I.

FEDERAL'S SOLUTION TO THE COST OF GAGING:
Impartial Gage Selection
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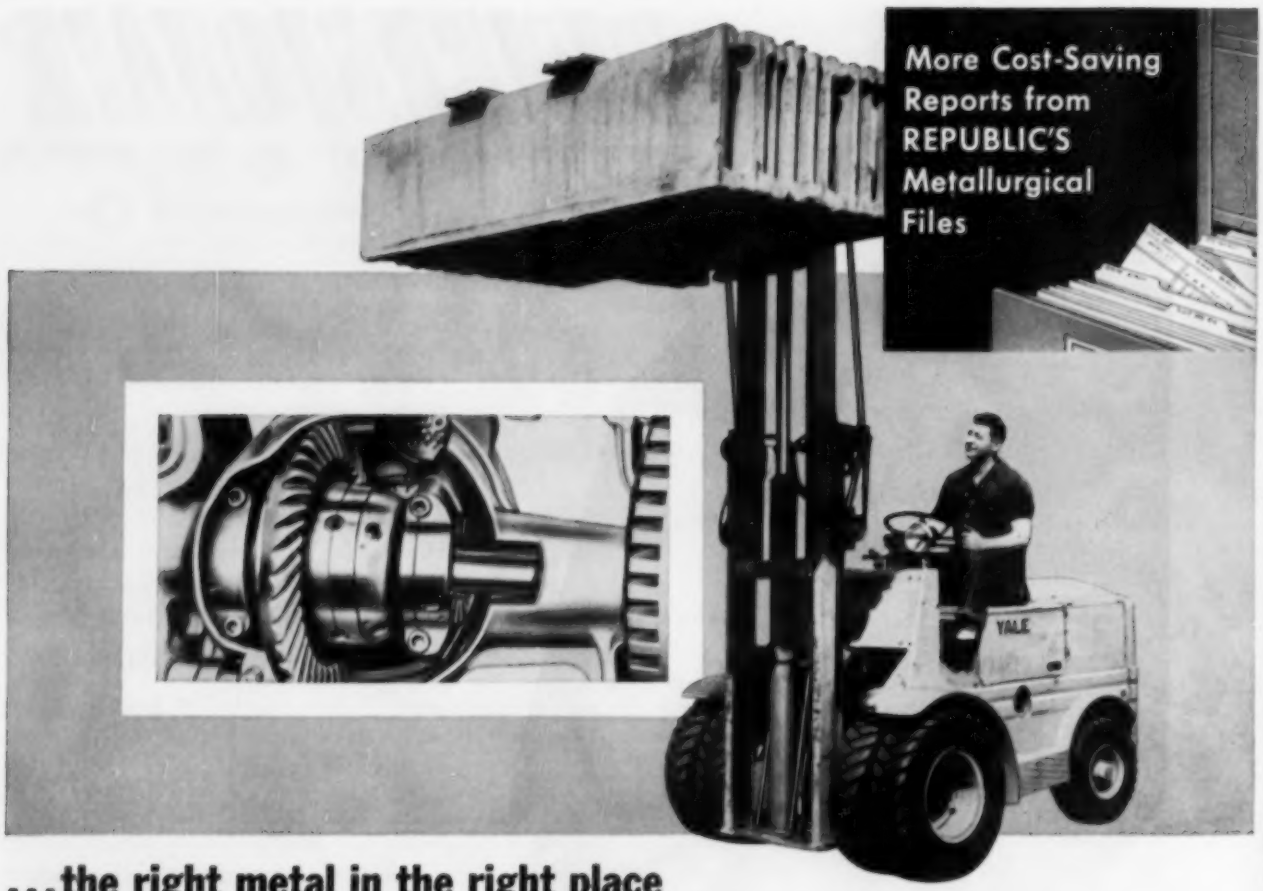
Ask FEDERAL *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging



...the right metal in the right place

HELPS RAISE LOAD CAPACITY 90,000 POUNDS

At one time, load capacity of lift trucks was restricted to the limits of elevators, usually 2,000 to 10,000 pounds, in multi-storied industrial plants. But with the present trend to one-story plants, the load limit is off.

The Yale & Towne Manufacturing Company, Yale Materials Handling Division, is building lift trucks with capacities as high as 100,000 pounds and using Republic Alloy Steels for vital areas of construction. An outstanding example is the full floating drive axle shown above. The axle, located in the front of lift truck, drives the unit and also bears the full weight of whatever is being lifted.

Prior to the use of Republic 4340 Alloy Steel, this was the part that most frequently failed in service. But, Yale & Towne engineers eliminated this problem by taking full advantage of alloy steel's superior strength and resistance to fatigue, shock and stress.

Republic Alloy Steels provide a combination of qualities essential to designing smaller sections to carry heavier loads with no sacrifice of strength or safety. You will find the highest strength values in these fine steels—plus an exceptionally high strength-to-weight ratio that permits the transmission of hundreds of horsepower through tough, strong axles, shafts and gears free from excess weight.

Add to these qualities a uniform response to heat treatment that produces hard, wear-resistant surfaces around tough cores; and you have a material that insures safety, extends equipment life, and cuts maintenance and replacement costs.

If you have a problem involving any one of these factors, Republic metallurgists and engineers are ready to assist you in the most efficient and economical application of these fine alloy steels to your product. The coupon will get things started.

REPUBLIC

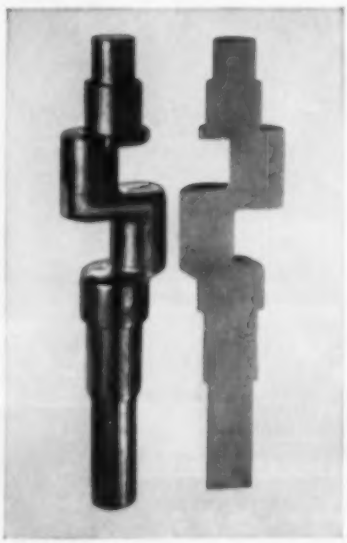
REPUBLIC STEEL

World's Widest Range of Standard Steels

Republic Titanium helps ice tray manufacturer increase anodizing rack life 100 times.

This company formerly used aluminum as rack material for anodizing ice trays and grids. But, its use was expensive and time-consuming. A considerable amount of aluminum dissolved during each anodizing and stripping cycle, and a stripping operation was required to remove anodic film formed for electrical contact on the previous cycle. Then the manufacturer switched to commercially pure Republic Titanium. The result? Rack life increased 100 times. Stripping operation eliminated. Stubborn resistance to chemical attack of cleaning, etching, brightening and anodizing solutions. Republic will help you apply Titanium to parts that must stand up to severe service. Write us.

Republic Chateaugay Pig Iron provides excellent surface, dimensional accuracy, uniform grain structure in ductile iron castings.



These two views of a shell-molded, ductile iron crankshaft show the excellent surface and the fine, uniform grain structure of the interior. Unseen is the high tensile strength, wear-resistance and top machinability provided by Chateaugay, Republic's exclusive premium Pig Iron. Chateaugay's high-carbon, low-phosphorus, copper-free content makes it ideally suited to ductile iron use. A Republic Pig Iron Metallurgist will show you, without cost or obligation, how Chateaugay consistently outperforms other pig irons. Check the coupon below if you would like a Pig Iron Metallurgist to call.

Republic Cold Drawn Special Sections cut machining costs on typewriter margin rack.

This part is produced at less cost because most of the machining has been eliminated. The manufacturer uses Republic Cold Drawn Special Sections that are preformed to the predominating cross section of the part. If you produce or design steel parts and are interested in reducing costs, you'll want to know more about these advantages of cold drawn special sections. (1) Almost limitless flexibility in design. (2) One-piece shapes replace costly assemblies. (3) Simplification of built-up, inter-locking or associated parts. (4) Benefits of cold drawing including higher strength, greater hardness, a bright, smooth finish that rarely requires further machining. Made to specification in all grades of carbon, alloy and stainless steel.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-1647
3120 East 45th Street, Cleveland 27, Ohio

Send more information on:
☐ Alloy Steels ☐ Titanium ☐ Special Sections
☐ Have a Pig Iron Metallurgist call.

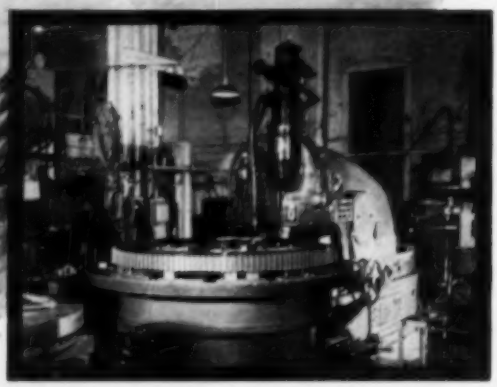
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

POWER to build America's Highways delivered by FELLOWS-CUT GEARS



120-Inch Gear Shaper set-up for 138-tooth cast steel gear of 290-330 Brinell, 5" face width, 1.783 C.P., 1.180" total depth of cut. Four cuts—1181 min. approx.

100-Inch Gear Shaper cutting 73-tooth internal gear, 3½" face width, 1.8235 D.P., 1.007" depth of cut. Material—steel casting 197-235 Brinell. One cut—320 min. approx.

The machines that move mountains of material for America's highway programs demand good, rugged, smooth running gears that will transmit, without failure, the many tons of force required.

The well known Thew Shovel Company of Lorain, Ohio is one of the major construction equipment makers that use Fellows machines to produce these gears. The largest Thew-Lorain gears require the largest capacity Gear Shapers in the Fellows Line, the 100-Inch and 120-Inch.

These two Gear Shapers are designed to take heavy cuts at coarse feeds on spur or helical gears. Capacities: 28" to 100" for externals and 46" to 100" for internals on the 100-Inch; 28" to 120" for externals and 46" to 120" for internals on the 120-Inch. Maximum face width on each is 8".

For *full* information about the complete Precision Line of cost-cutting Fellows Gear Production Equipment get in touch with your Fellows representative. Write, wire or phone any Fellows office.

THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 North Woodward Ave., Royal Oak, Mich.
150 West Pleasant Ave., Maywood, N.J.
5835 West North Avenue, Chicago 39
6214 West Manchester Ave., Los Angeles 45

THE PRECISION LINE *Fellows* *Gear Production Equipment*

CALENDAR
OF MEETINGS

Jan. 12, American Electroplaters Society: Winter meeting, Sheraton Penn hotel, Pittsburgh. Society's address: 445 Broad St., Newark 2, N. J. Secretary: John P. Nichols.

Jan. 13-16, Institute of Scrap Iron & Steel Inc.: Annual meeting, Eden Roc and Fontainebleau hotels, Miami Beach, Fla. Institute's address: 1729 H St. N.W., Washington 6, D.C. Executive vice president: E. C. Barringer.

Jan. 14-18, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac and Statler hotels, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Jan. 16-18, American Management Association: International management conference, Roosevelt hotel, New York. Association's address: 1515 Broadway, New York 36, N.Y. Secretary: Andrew P. Donovan.

Jan. 16-17, Caster & Floor Truck Manufacturers Association: Winter meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: H. P. Dolan.

Jan. 17-18, Steel Plate Fabricators Association: Annual meeting, Palmer House hotel, Chicago. Association's address: 79 W. Monroe St., Chicago 3, Ill. Secretary: J. Dwight Evans.

Jan. 18, Malleable Founders' Society: Semiannual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 14, O. Managing director: Lowell D. Ryan.

Jan. 19-23, Truck-Trailer Manufacturers Association: Annual meeting, Del Coronado hotel, Coronado, Calif. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 21-25, American Institute of Electrical Engineers: Winter general meeting, Hotel Statler, New York. Institute's address: 33 W. 39th St., New York 18, N.Y. Secretary: N. S. Hibshman.

Jan. 21-22, Solar Furnace Symposium: Westward Ho hotel, Phoenix, Ariz. Sponsor: Association for Applied Solar Energy, 3424 N. Central Ave., Phoenix, Ariz. Secretary: John I. Yellott.

Jan. 23-24, Steel Shipping Containers Institute Inc.: Winter meeting, St. Regis hotel, New York. Institute's address: 600 Fifth Ave., New York 20, N. Y. Secretary: L. B. Miller.

Jan. 24-26, National Tool & Die Manufacturers Association: Winter meeting, Biltmore hotel, Palm Beach, Fla. Association's address: 907 Public Square Bldg., Cleveland 13, O. Executive secretary: George S. Eaton.

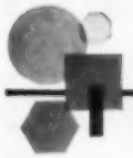
Jan. 28-31, Associated Equipment Distributors: Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Association's address: 30 E. Cedar St., Chicago 11, Ill. Executive secretary: P. D. Hermann.

Jan. 28-31, American Management Association: West coast general management conference, Hotel Statler, Los Angeles. Association's address: 1515 Broadway, New York 36, N. Y. Secretary: Andrew P. Donovan.

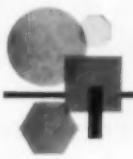
Jan. 28-31, Plant Maintenance & Engineering Show & Conference: Public Auditorium, Cleveland. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 28-29, Industrial Heating Equipment Association Inc.: Annual meeting, Shoreham hotel, Washington. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Carl L. Ipsen.

WHEELOCK, LOVEJOY & COMPANY, INC.
1250 Marquette Street, Cleveland Ohio



WHEELOCK, LOVEJOY & COMPANY, INC.
1855 So. Kilbourn Avenue, Chicago Illinois



WHEELOCK, LOVEJOY & COMPANY, INC.
265 Pennsylvania Avenue, Hillside New Jersey

WHEELOCK, LOVEJOY & COMPANY, INC.
12989 Greeley Avenue, Detroit Michigan

7 WAREHOUSES AT YOUR SERVICE

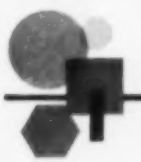
You'll get quick action on your order for alloy steel bars, billets or forgings . . . no matter what size, shape or heat treatment you require . . . when you call any one of our seven warehouses.

All seven are conveniently located in principal industrial areas. Each is staffed by expert metallurgists, and is well-stocked to give you speedy service.

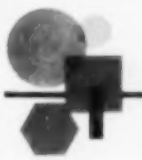
Fill your current needs by ordering our own HY-TEN steels, the "standard steels of tomorrow", or standard AISI or SAE grades.

Or write today to our Cambridge office for your *free* Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

In Canada: Sanderson - Newbould, Ltd., Montreal and Toronto



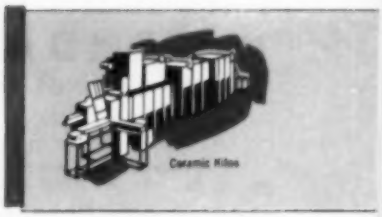
WHEELOCK, LOVEJOY & COMPANY, INC.
144 Milton Street, Buffalo New York



WHEELOCK, LOVEJOY & COMPANY, INC.
4524 W. Mitchell Avenue, Cincinnati Ohio

HOME OFFICE:
WHEELOCK, LOVEJOY & COMPANY, INC.
131 Sidney Street, Cambridge 39 Massachusetts

BRAND-NEW IDEA in heat treating furnaces



proving again . . . .

FOR CARBONITRIDING, BRIGHT HARDENING, CARBURIZING OF SMALL METAL PARTS

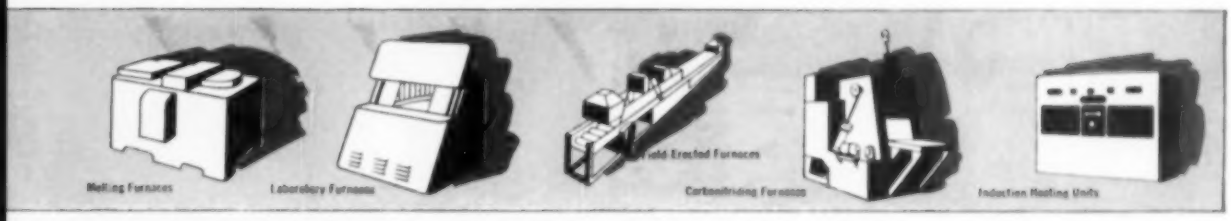
This is a completely new furnace, an exclusive Lindberg development. It is the first time induction heating has ever been offered in a heat treating furnace. No elements, no burners, no electrical or gas connections in it. Heating efficiency is high and the furnace can be brought to hardening temperatures in 17 minutes from cold. Temperature control is highly accurate, eliminating temperature override and lag for all practical purposes.

The Induct-O-Ring's circular shape eliminates door-opening heat and atmosphere losses and saves floor space. Work load is automatically charged and moved through the work chamber by a gentle, quiet, reciprocating movement of the furnace. The furnace is completely adaptable to automatic production processes, where its precise heat control, negligible maintenance and dependable operation are of particular importance.

- **No elements, no burners**
- **No gas or electric connections in furnace**
- **Built like a fine machine tool**
- **Precise temperature control**
- **Very low maintenance**
- **Quiet, automatic, trouble-free**

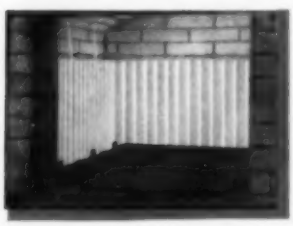
induct-O-ring*

*U.S. and foreign patents pending



. . . it's better to talk it over with LINDBERG

If you are concerned with the application of heat to industry it makes good sense to talk it over with the most widely experienced experts you can find. We believe we have them here at Lindberg. Our only job is developing industrial heating equipment and we offer the most complete line in the field; heat treating furnaces, melting furnaces, high-frequency induction units, ceramic kilns; big ones, small ones, built in our own plant or field-erected. This gives us the experience and know-how to come up with something really new, like this revolutionary Induct-O-Ring furnace, time and time again. So take your industrial heating problems to the experts. Our engineers and technicians can have the right answer. Talk it over with Lindberg.



Another Lindberg achievement! The use of electricity in carbonitriding and carburizing furnaces has been made completely practical by Lindberg's recent development of the CORRTHERM electric heating element. This element is now being used in many furnace installations where ordinary electric heating elements could not operate successfully.

For fuel-fired furnaces, another important development, the famous "dimple" vertical radiant tube was created by Lindberg. This lightweight, easily-changed tube provides a big advance in furnace efficiency and effects a marked saving in operation and maintenance costs. Minimizes shut-downs and costs for tube changes.

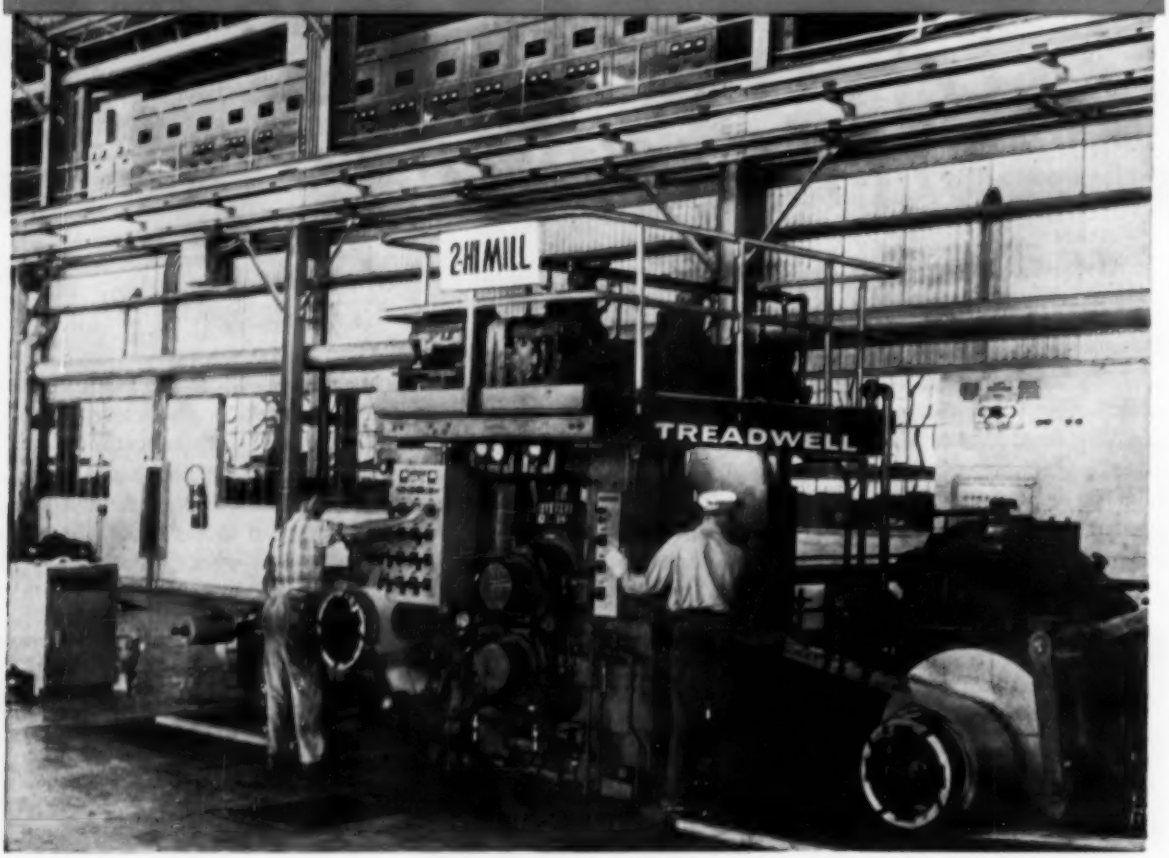
Through the years Lindberg research and development laboratories have originated and perfected many other important heating processes, developments such as the Cyclone tempering furnace, automatic control of carbon potential in furnace atmospheres, 60 cycle induction melting and completely automatic ceramic kilns.

Many important Lindberg developments have come as a direct result of some good customer's need. With the customer's cooperation Lindberg engineers have frequently provided an answer to some pressing production problem. You will benefit, too, whether you need some specific Lindberg equipment or have an industrial heating problem that needs a solution if you'll just talk it over with Lindberg. Call your nearest Lindberg Field Representative. There's one (see your phone book) in every major industrial center.

LINDBERG ENGINEERING COMPANY
2441 West Hubbard Street, Chicago 12, Illinois
Los Angeles Plant: 11937 S. Regentview Ave., at Downey, Calif.

Associate Companies: Lindberg Industrial Corporation, Chicago • EFCO-Lindberg, Ltd., Montreal, Canada • Lindberg Italiana, Milan, Italy • The Electric Furnace Company, Ltd., Weybridge, Surrey, England • Etablissements Jean Aubé, Paris, France • Lindberg Industrie Ofenbau, Gross Auheim, Germany • Toyo Menka, Tokyo • Lindberg Engineering Company (Australia) Pty. Ltd., Melbourne

Treadwell



Temper or skin pass and cold rolling mills for high carbon, stainless and carbon steel strip complete with coiling equipment.

Manipulators, Mill, etc.
Mills, Blooming & Billet
Mills, Merchant & Bar
Mills, Rod
Mills, Sheet
Mills, Strip (Cold)
Mills, Strip (Hot) & Skelp
Mills, Vertical Edging
Tables, Mill
Tables, Tilting & Lift
Tables, Transfer
Transfers

Coilers & Reels
Conveyors, Coil
Drives
Ejectors, Furnace
Gauges, Shear, Saw, etc.
Beds, Cooling
Beds, Inspection
Bumpers, Furnace
Pushers, Furnace
Repeaters
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Steel and Iron Castings
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BETTER GRADE MACHINERY

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EASTON, PA.

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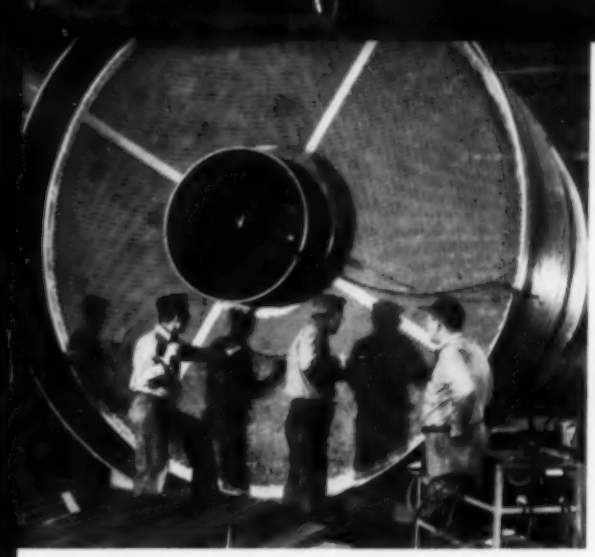
1015 FARMERS BANK BLDG.
PITTSBURGH 22, PA.
ATlantic 1-2883



FOR HIGH TEMPERATURE STRENGTH. This looks like a sieve, but actually it is a Stainless Steel plate punched with 25,400 holes, and it makes up the end plate of a chemical plant heat exchanger. After the tubes were inserted the exchanger was placed in high-temperature, intensely corrosive 24-hour service. It was made by the Nooter Corporation, St. Louis.

NOTHING *can equal* *Stainless Steel*

for its combination of desirable properties

No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When seeking a source of supply, remember that United States Steel offers you the widest range of types, finishes and sizes.

FOR CORROSION RESISTANCE. Rare Earths, Inc., produces such valuables as cerium, lanthanum and praseodymium by means of an elaborate chemical separation process. In the filter press, corrosion destroyed carbon steel plate rods in six months. Stainless Steel rods were installed over six *years* ago, and are still in fine condition.

FOR TAKING A BEATING. These are 8th grade students from Dormont, Pa., public schools in a domestic science class. The sink tops were made by Pride Mfg. Co., Pittsburgh, from USS Stainless Steel. Says Pride, "These Stainless sink tops are ideal for school use. We've seen some 20-year-old sinks that still look as good as new."

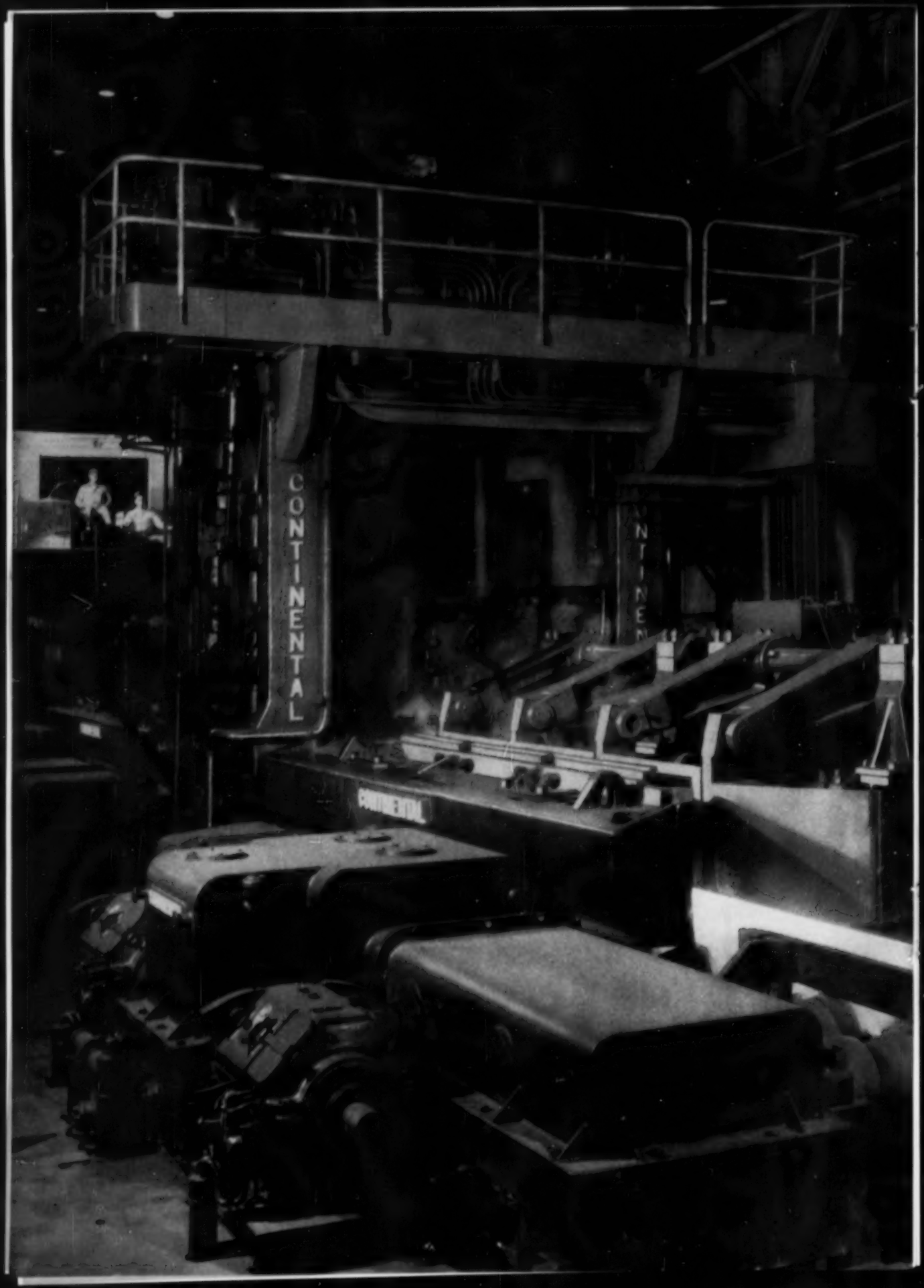
UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO · NATIONAL TUBE DIVISION, PITTSBURGH
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS STAINLESS STEEL

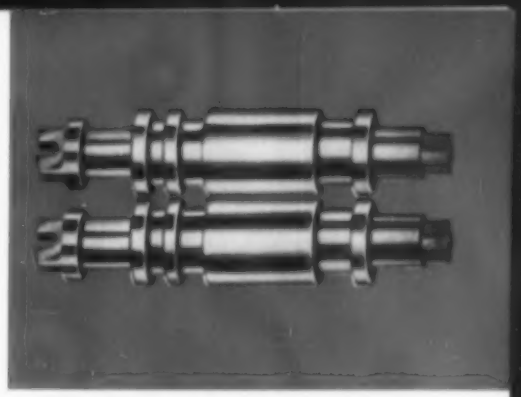
SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS

USS

UNITED STATES STEEL


CONTINENTAL

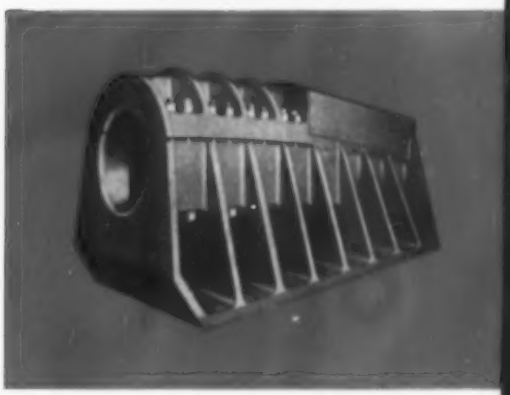
CONTINENTAL 40-inch, 2-high reversing blooming-slabbing mill in the Fairless Works of the United States Steel Corporation.



ROLLS—iron, alloy iron and steel rolls for all types of rolling mills.

BLAW-KNOX

makes what it takes to handle tough blooming-slabbing operations



CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.

In operation as an intermediate mill for subsequent rolling, this rugged Continental 40-inch reversing blooming-slabbing mill is providing excellent performance in the United States Steel's Fairless Works.

Variations of the basic design of this mill are built by Blaw-Knox to serve as break-down mills for billet and bar mills, rail and structural mills, and merchant mills.

Blaw-Knox designs and builds complete rolling mill installations—assumes undivided responsibility from preliminary engineering to satisfactory operation. At any time we'll be glad to discuss your plans with you.

WELDMENTS—fabricated steel plate, or cast-weld design.

50th Anniversary
BLAW-KNOX
1906-1956
CONTINENTAL

BLAW-KNOX COMPANY

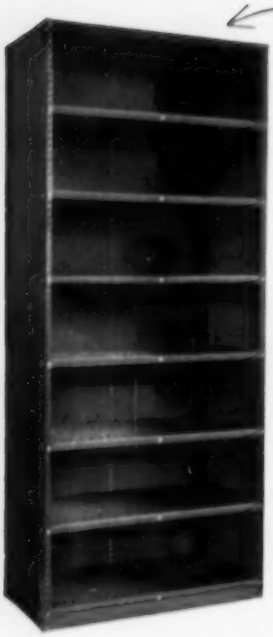
Foundry and Mill Machinery Division

Blaw-Knox Building • 300 Sixth Avenue
Pittsburgh 22, Pennsylvania

Complete Rolling Mill Installations . . . including all auxiliary equipment . . . for ferrous and non-ferrous metals

Hot strip mills • cold strip mills • slabbing mills • temper mills • universal mills • plate mills • blooming mills • structural mills • rail mills • billet mills • rod mills • merchant mills • roll lathes • chippers • special machinery • and complete auxiliary equipment

HOW TO USE HALLOWELL ADJUSTABLE SHELVING



SELECT THE BASIC SHELVING UNIT

USE IT INDIVIDUALLY
OR IN COMBINATION

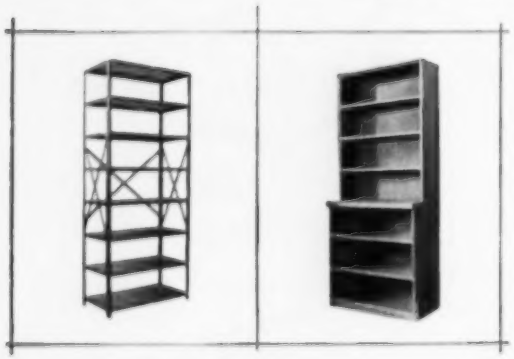
CLIP IN DIVIDERS

PUT IN SHELF BOXES

ADD SLOPING SHELF UNITS

AND
BIN FRONTS
AS NEEDED

ATTACH SWINGING
OR SLIDING DOORS



Baked-on Enamel Finish · Sturdy Steel Construction · Interchangeable Parts Easy to Assemble · Stocked by Leading Shop Equipment Dealers · Send for Bulletin 2111 · Hallowell Shop Equipment Division · Standard Pressed Steel Co., Jenkintown 33, Pa.

HALLOWELL SHOP EQUIPMENT DIVISION
STANDARD PRESSED STEEL CO.
SPS
JENKINTOWN PENNSYLVANIA

BENCHES (CABINET, WORK, UNIT) • STOOLS AND CHAIRS • SHOP DESKS • TOOL STANDS AND CABINETS • DRAWERS, DRAWER TIERS • STEEL CARTS • SHELVING

The man with the shield

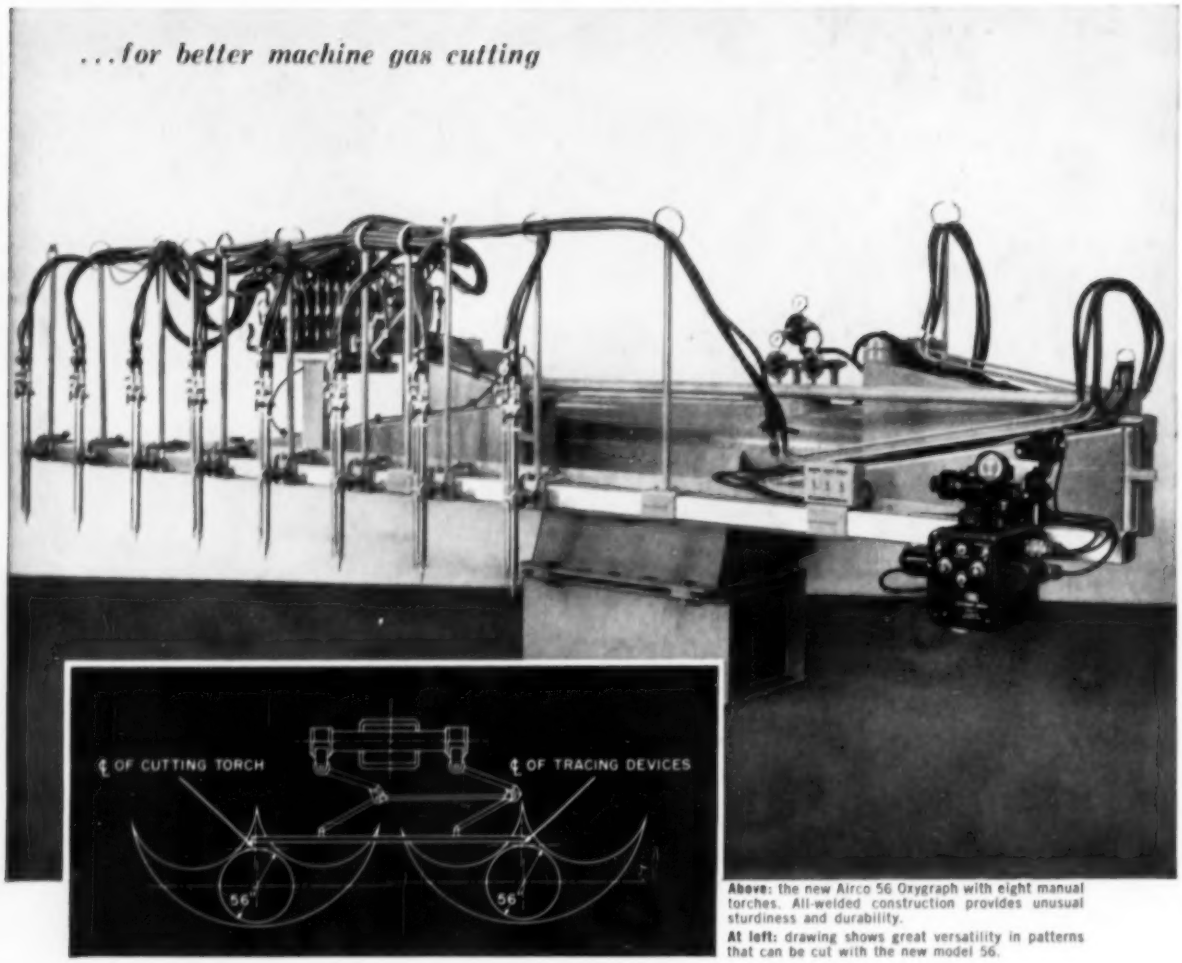
During pouring, the future of a mill roll hangs in the balance. Its quality is wholly dependent, for the moment, upon the skill and experience of the pouring crew. All the metallurgy, all the hours of pattern making and painstaking mold preparation, all this rests on the shoulders of the man with the shield and the flawless execution of the orders he gives as he watches the molten metal swirl up from the bottom of the mold.

Mack-Hemp's pouring crews rank among the country's top foundrymen. Their ability is reflected in the quality of Mack-Hemp rolls, a quality that has been unmatched for more than one hundred and thirty years...an important reason why *you get more tonnage from the rolls with the Striped Red Wabblers.*

MACKINTOSH-HEMPHILL
Division of E. W. BLISS Company
Pittsburgh and Midland, Pa.

BLISS

...for better machine gas cutting



Above: the new Airco 56 Oxygraph with eight manual torches. All-welded construction provides unusual sturdiness and durability.

At left: drawing shows great versatility in patterns that can be cut with the new model 56.

NEW...Airco 56 Oxygraph

...for better machine gas cutting of larger work on production schedules

This newly developed Airco 56 Oxygraph meets the demand for a multi-torch oxy-acetylene shape cutting machine that will handle substantially large areas. It *cuts a full 56" circle,* and corresponding square and rectangular shapes. Rugged box girder design is used for the pantograph arms, holding vibration to a minimum. Tracer response is smooth and friction-free as a result of large diameter ball bearings in the pantograph hinges and operating bar assembly.

This newest of Airco Oxygraphs will cut an unlimited variety of shapes from steel plates, slabs, billets and forgings. Flexibility of design allows amplifying scope of machine to meet increased shop demands. Tracers are available in four types: electronic, manual, magnetic and spindle. This widened capacity of the new model 56 marks another step forward in welding and cutting progress. For detailed information on the New 56 Oxygraph, write direct to Airco.

welding
AT THE FRONTIERS OF PROGRESS YOU'LL FIND ...

AIRCO®

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AIR REDUCTION SALES COMPANY

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Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PUBECO** — carbon dioxide, liquid-solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetates, alcohols, and other synthetic resins.

Want to make every day Christmas?

It's easy! Switch to CINCINNATI (PD)* WHEELS. For *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that *can save you money* . . . and *increase your production.*

You'll say there *is* a Santa Claus after all when you learn that through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel every time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS *are priced no higher than ordinary wheels.*

So, to make every day Christmas, just contact your CINCINNATI Grinding Wheel distributor. Or, contact us direct and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, Cincinnati 9, Ohio.

Remember—*only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

CINCINNATI Grinding Wheels

* Trade Mark Reg. U. S. Pat. Off.

Typical parts machined by Taylor Instrument Companies from Alcoa Aluminum Screw Machine Stock

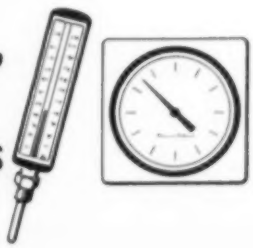
HOW TAYLOR INSTRUMENTS* GET A LIFT AND A LONG LIFE FROM ALCOA SCREW MACHINE STOCK

Where measurements must be precise, you'll find Taylor Instruments . . . insuring a jet pilot's safe descent by parachute . . . warning a ship's captain of changing weather . . . telling the doctor your temperature and blood pressure. In everyday life, and in thousands of industrial plants, Taylor Instruments have helped America measure its progress since 1851.

What are Taylor's requirements for screw machine parts? Precision, naturally. Corrosion resistance is also important since many Taylor Instruments are installed where maintenance is virtually impossible. Because many Taylor products, like your home thermometer, are mass-produced, cost is exceptionally important in the selection of a screw machine stock.

With these requirements in mind, read why Taylor Instrument Companies use Alcoa® Aluminum Screw Machine Stock. See if their experience plus the inescapable economics of aluminum versus brass doesn't dictate a hard look at all your screw machine parts. For competent technical help in making such an analysis, simply call your local Alcoa sales office listed under "Aluminum" in your classified phone book. Aluminum Company of America, 874-M Alcoa Building, Pittsburgh 19, Pennsylvania.

*Taylor
INSTRUMENT COMPANIES

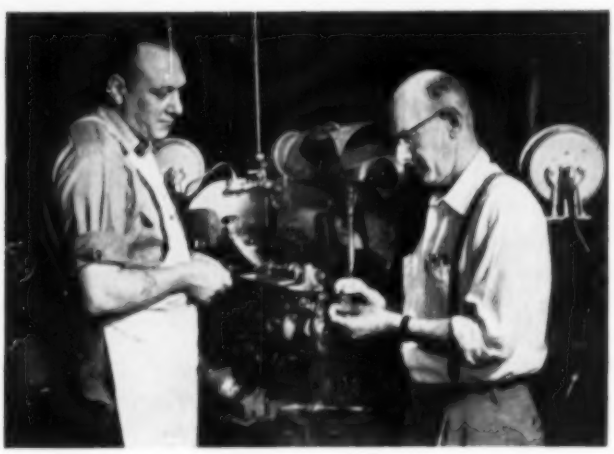


IN PURCHASING

Asst. Purchasing Agent, J. R. Mahan, says, "Dependability is the single most important requirement of a supplier. This we get in full measure from Alcoa. Quality has always been dependable. Deliveries have come when promised. Service and technical help are always available to us and their answers are right. We find this Alcoa dependability also applies to Alcoa distributors from whom we get prompt delivery."

IN METHODS ENGINEERING

H. D. Klitgord, Manager, Methods Engineering Department, says, "We have a continuous cost study of materials for all of our screw machine parts. Equal or better performance has been our criterion in every instance where money could be saved. We are saving $100,000 per year by using aluminum. Our conversion at present is about 40% and we anticipate an increasingly greater use of aluminum bar stock."



IN PRODUCTION

Mr. H. Bubel, Group Leader, Automatic Screw Machine Department, says, "We are machining aluminum at the maximum production rates possible. Alcoa technical people have been of great assistance to us in recommending cutting oils and tools, and helping us maintain our close tolerances and fine finishes."

THE ALCOA HOUR
TELEVISION'S FINEST LIVE DRAMA
ALTERNATE SUNDAY EVENINGS

Your Guide to the Best in Aluminum Value

ALCOA ALUMINUM
SCREW MACHINE STOCK

do you want low-cost corrosion or contamination

Acetone • Borax • Calcium Carbide • Calcium Carbonate • Calcium Chloride (Flake) •
Ethyl Acetate • Ethyl Alcohol • Ethylene Glycol • Glycerine • Insecticide Concentrates •
Soap and Soap Lye • Soda Ash • Sodium Bicarbonate • Sodium Silicate •

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LECTRO-CLAD* Trademark

Nickel Plated Steel Plates will give it to you

Yes, you can get low-cost, yet effective protection against contamination and corrosion with all these chemicals...and many more!

Effective in heavy industrial applications where the corrosion rate does not exceed 0.0015 inches per year, CF&I LECTRO-CLAD Nickel Plated Steel Plates successfully combine the corrosion and contamination resistance of nickel and the economy and strength of carbon steel.

That's because CF&I LECTRO-CLAD is made by the Bart Process, which consists of electrodepositing a heavy layer of 99% pure nickel on a carbon steel plate. This process results in a permanent bond between the nickel and the steel base. The nickel plating is customarily supplied in the 8-10 mil range; however, it can be plated up to 15-20 mils, if specified.

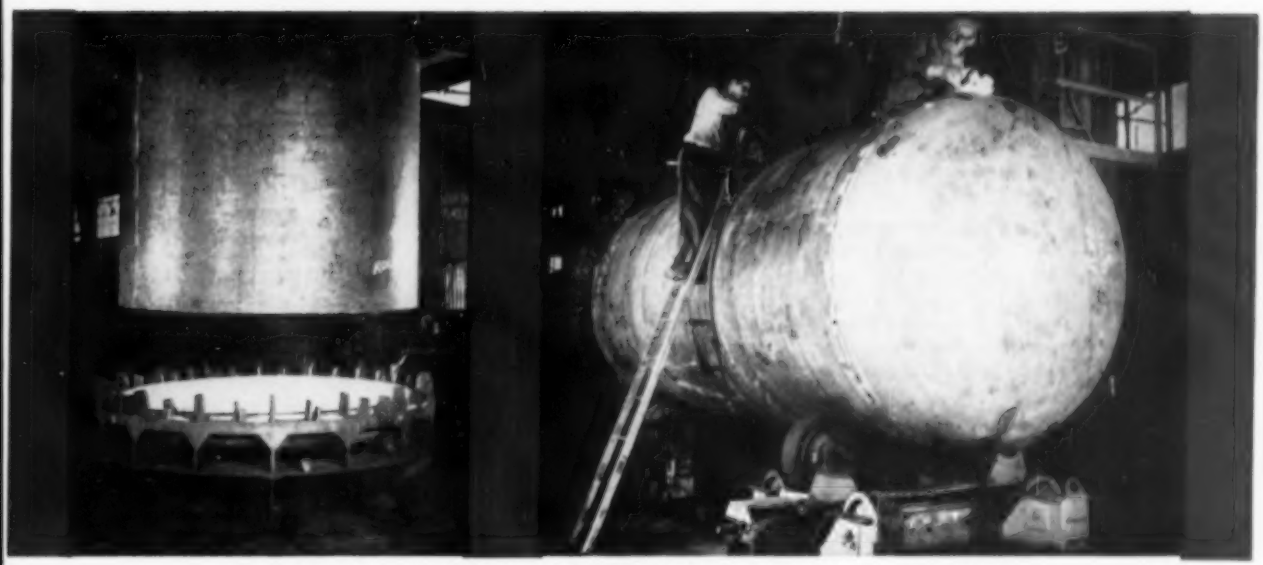
What's more, CF&I LECTRO-CLAD Nickel Plated Steel Plates are easily fabricated without costly special equipment. Just use regular shop equipment and bend it...weld it... roll it—the protective nickel layer will not check, spall or flake!

Ask our nearest sales office for the complete story on economical, effective, easy-to-fabricate CF&I LECTRO-CLAD Nickel Plated Steel Plate today. Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

***NICKEL PLATED BY THE BART LECTRO-CLAD PROCESS**

protection against with these chemicals?

Caustic Soda • Chlorinated Hydrocarbons • Cold Hydrofluoric Acid • Dibutyl Phthalate
Methyl Alcohol • Petroleum Catalysts • Phenol • Potash • Resin Plasticizers • Salt
Sodium Sulphate • Titanium Dioxide • Tricresyl Phosphate



Assembling a tank fabricated from CF&I LECTRO-CLAD Nickel Plated Steel Plates.

3798

Claymont Steel Products

CF&I

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

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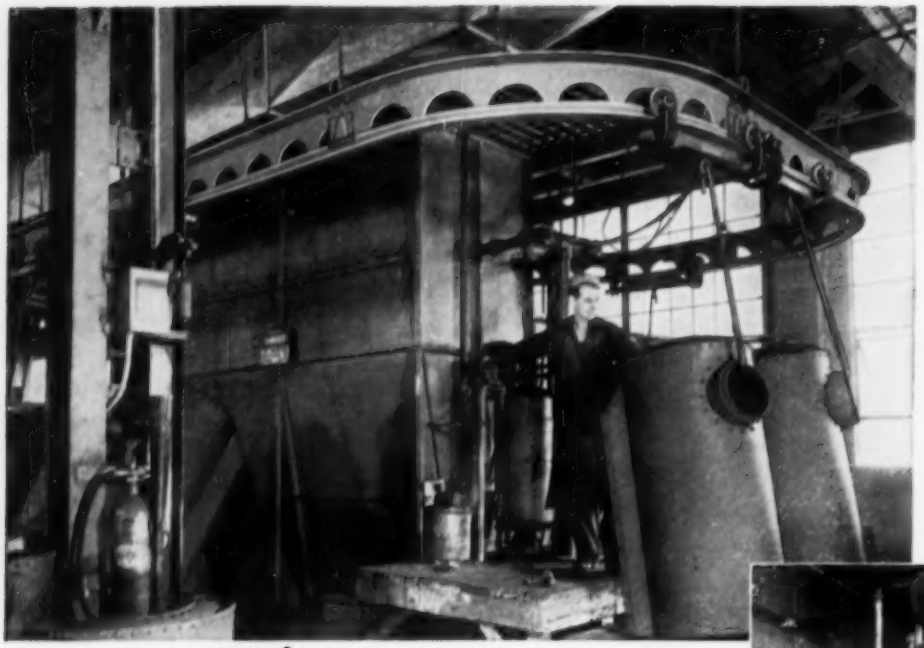


One man transfers furnace bodies, weighing 200 lbs., coming from welding booths to Tramrail track by means of a lift platform. Usually when he advances one carrier to spray booth, all 16 carriers must be moved at same time.

The curved track section is necessary to bring the furnace bodies near the water screen during spray painting so that paint in atmosphere will be removed properly. All points of a body are easily reached when supported overhead and the work is extremely fast.

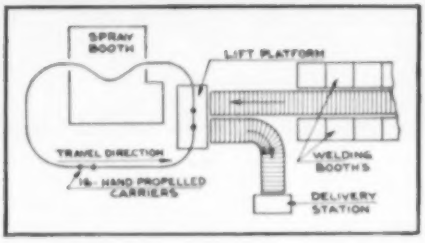
Easy Push Moves 16 Carriers on Spray Booth Loop

CAN one man push 16 loaded four-wheel carriers (with 64 wheels in all) around an enclosed Tramrail track loop having six left-hand and two right-hand curves?

That question bothered the Armstrong Furnace Co., Columbus, Ohio, one of the world's largest furnace manufacturers, when they were developing their paint-spray systems for painting furnace bodies. There was considerable fear that friction and binding of so many carriers would create too great a load for one man to push hundreds of times during a normal working day.

They now have two such systems in operation. One man easily moves the carriers even when all are loaded. Little effort is required because of ball-bearing wheels and hard smooth flat treads on both wheels and track and easy swiveling yokes.

The systems are extremely efficient, requiring only two men each. 300 furnace bodies can be painted with each, in an eight-hour period.



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THE CLEVELAND CRANE & ENGINEERING CO.
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CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Color indicates uses of copper in one of the 7-foot electronic amplifiers or "repeaters".

The cables and "repeaters" must be protected against corrosion by sea-water, against marine life, against tremendous water pressures. In this situation, copper was the answer!

Phoning Europe? You'll talk over COPPER cables!

Today you can pick up your telephone and call Europe... and your connection will be quick, your conversation clear. Both parties on the line will sound as though they were talking in the same city, not an ocean apart.

COPPER helped make this possible when the first transatlantic telephone cables went into service recently!

Telegraph cables have connected North America and Europe since 1858. But they would not serve for telephoning. Two and a half miles down, voice signals carried only a few miles along the cable. Then they "faded".

This problem was solved by the use of electronic amplifiers or "repeaters". Placed along the new cables at 40-mile intervals, they boost the voice signals . . . *boost them one million times!* It was the electrical conductivity of *copper* and its capacity for miniaturization that made these delicate, complex devices possible!

Copper's flexibility, too, was essential. For the long, tubular "repeaters" had to be rolled over the cable ship's 7-foot drum, as it paid out cable.

* * * *

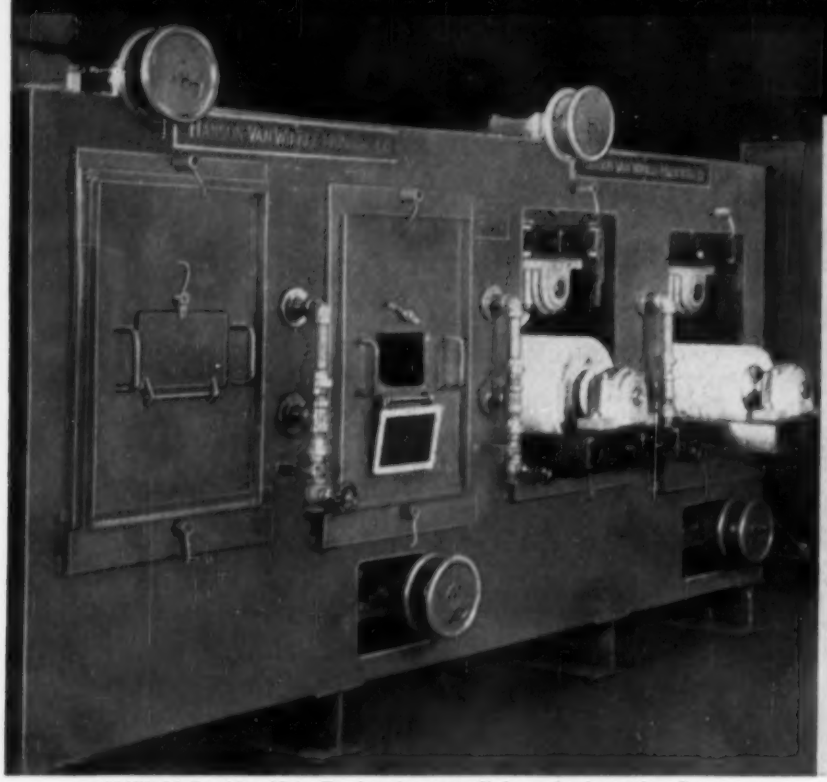
So today . . . when you pick up your telephone and call Europe, you'll be talking over *copper*.

If progress is essential to your business, remember that copper is essential to progress.

COPPER & BRASS
RESEARCH ASSOCIATION
420 Lexington Avenue, New York 17

COPPER OR ITS ALLOYS PROVIDE THESE ADVANTAGES: Best conductor of electricity commercially available • Does not rust . . . high corrosion resistance • Best heat transfer agent of all commercial metals • Easy to machine, form, draw, stamp, polish, plate, etc. • Welds readily . . . excellent for soldering and brazing

CONTINUOUS STRIP AND SHEET METAL PROCESSORS



cut cleaning time to a fraction with this automatic H-VW-M SCRUBBER UNIT

H-VW-M Scrubber Unit. Brush units are pulled out for inspection. In a matter of minutes they could be replaced, if necessary with new brushes.

...and no down time either! Brushes are replaced easily while unit is in operation!

H-VW-M Scrubber Units—which adapt to fit into any system—are equipped with an exclusive, patented device that permits replacement of brushes *while the unit is running*. Just turn a few bolts, slide worn brush out, and insert replacement. Not a moment's production time is lost!

Add the advantages of this remarkable new feature to the enormous savings you'll realize in cleaning, reworking and inspection time, and you'll see why the rugged, efficient H-VW-M Scrubber Unit has no equal.

Get more facts about H-VW-M Scrubbers, with their exclusive easy-brush-replacement feature, by writing today for Bulletin HB-100.

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Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

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INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

They may Seem the same, but...

American is the name!

However you calculate it, your true fastener cost contains four things:

1. price **3. quality**
2. service **4. research**

Occasionally, you may find local price differentials you think may be worth your while. But no one gives you more of all four than American.

AMERICAN GIVES YOU MORE OF ALL FOUR

In service, with a tightly-knit system that meets the needs of the most intricate production lines. Like an appliance manufacturer who uses 120 million American Phillips fasteners a year.

In quality, with a unique quality control program that includes such protection for you as statistical sampling on production runs.

In research, which produced not only the Phillips Head fastener, but showed one customer a substantial saving by converting a three-part, assembled machine screw into a single cold-headed unit.

There are many sources of Phillips-type fasteners. But only at American will you find more of the four basic features you want — price, service, quality, research.

Make your own comparisons . . . send us your inquiry for price and delivery or your specifications for special fasteners. Write:

American!

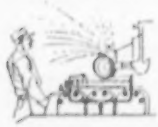
AMERICAN SCREW CO. • WILLIMANTIC, CONN.
NORRISTOWN, PA. • CHICAGO, ILL. • DETROIT, MICHIGAN

ARE RINGS YOUR PROBLEM?

then HELP YOURSELF

WELDING

FABRICATING



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Send us your blueprints and we will show you how we can fit into your picture.

to a quarter of a million square feet equipped to solve your problem

American Welding has a quarter of a million square feet of floor space that houses the equipment necessary to manufacture production runs of welded rings (made from rectangular bars or special mill shapes) or circular weldments — from 6″ to 96″ in diameter, of ferrous or non-ferrous metal.

And that's not all — 900 specialists in ring manufacture are backed with the best in engineering and research — with heat treating, x-ray and test equipment required to meet aircraft specifications.

Let Amweld become your production welded ring department.

THE AMERICAN WELDING & MANUFACTURING CO.
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AMERICAN WELDING

Metalworking Outlook

Look Out for the Second Half

If inventory buildups outpace sales in the first half of 1957, the second six months will lag behind the first in economic activity. But if sales outrun inventories in the first half, the second six months will be sensationally good, and the gross national product should hit $430 billion for the year, compared with about $411 billion for 1956. In the last 11 years, the second half has been worse than the first on only three occasions—in 1949, 1951 and 1953.

Prices, Production: Both Up

Price increases have averaged 1.5 per cent per year since 1950. But physical industrial production gains have averaged 3.5 per cent per year since the start of the decade. So, look for about the same price and physical production increases in 1957. If this rate continues until 1970, physical production in that year will be double the 1950 level.

Fabulous Appliances

In Chicago, 22.6 per cent of 3000 families interviewed said that an air conditioner would be the next appliance they would buy. These followed: Clothes dryers, washing machines, food freezers, refrigerators, automatic dish washers. One out of every 10 interviewed by the *Chicago Tribune* reported that they already had definite plans to purchase their next preferred appliance. One out of three indicated they wanted to purchase their appliance within the next year. Only 40 per cent of the washing machines in the Chicago area are automatic.

More Power Ahead for Skilled Workers?

Skilled worker discontent may spell additional bargaining problems for management. Last week in Chicago, United Auto Workers' skilled tradesmen set their price for staying in the union. They will ask for these constitutional changes at the annual UAW convention next April: 1. Skilled workers will have the right to vote separately on all sections of master contracts or supplementary agreements pertaining to skilled trades. 2. They'll have the right to separate strike action. 3. Wage merit spreads will be eliminated, with current maximum to be the starting point for bargaining.

Employment Slips

Total employment dipped 900,000 to 65.3 million in mid-November from a month before, the Labor and Commerce departments report. Unemployment rose by 550,000 to 2,460,000. Earnings of factory workers reached new records—up 21 cents from mid-October to $82.42 per week in mid-November. Hourly earnings went up 1 cent to $2.03. Although total employment dipped in mid-November, it was still at a record level for the month. Almost the entire drop occurred in agriculture. At the same time, nonagricultural employment did not show its usual November pickup. Yet, nonfarm employ-

Technical Outlook—p. 85 Market Outlook—p. 119

ment of 52.4 million in mid-November still topped last year's total by 1.2 million.

Decision on Overtime

The Supreme Court leaves standing three decisions that the government says will "immeasurably undermine" the basic overtime policy in federal labor law. The ruling in effect permits employers to sign individual contracts with their workers under which the employees are paid a guaranteed weekly wage figured as if they worked overtime even though they actually labored no more than 40 hours. Lower courts have said such arrangements are legal, and the high court refused to review their rulings.

Mr. Rarick Will Oppose

Don C. Rarick will oppose David McDonald as president of the United Steelworkers of America when union members ballot for their chief officer on Feb. 12. As chairman of the National Dues Protest Committee which is fighting the $2 boost in the monthly levy voted last fall at the union's convention, Mr. Rarick is drawing support from a wide variety of disgruntled members. But it doesn't look like he'll have enough help. Watch for Mr. McDonald to be re-elected and the dues protest movement to wither.

Executive Salaries Rise

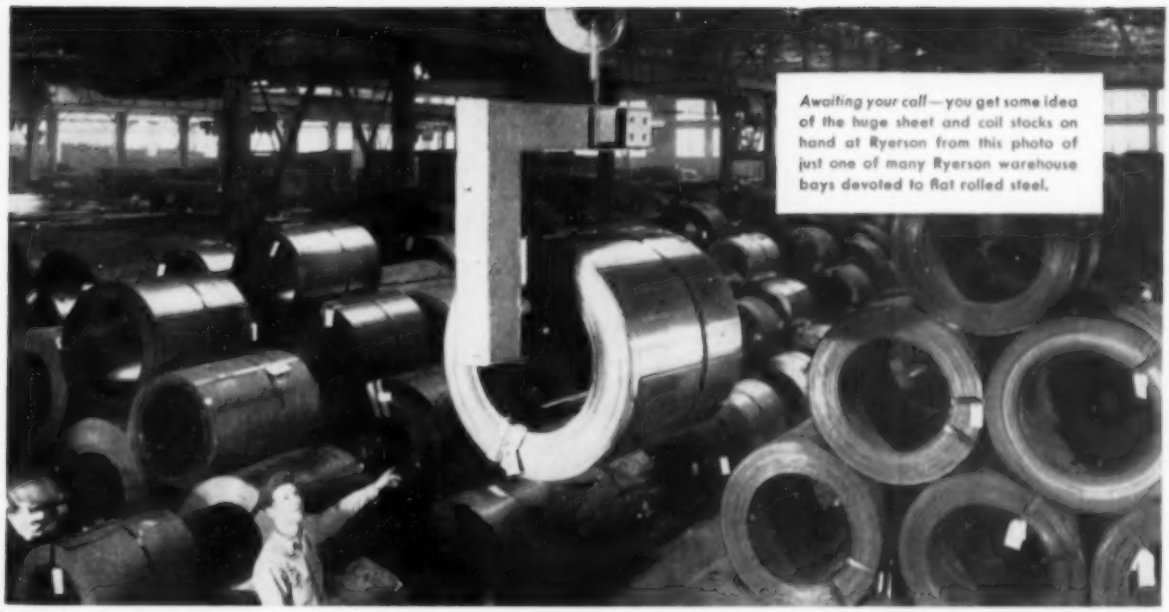
Top corporate executives made 5.9 per cent more last year than in 1954 (including salaries, bonuses and company contributions to retirement funds), says American Management Association. Here's how that compares with pay increases of other groups: Middle management, 5 per cent; sales personnel, 3.5 per cent; engineers, scientists and other administrative and technical personnel, 8.6 per cent. Bonus payments to top executives amounted to about 16 per cent of base salaries.

Expansion in Atomics

In the next four years, between $300 million and $350 million will be spent by industry and other private organizations on commercial atomic energy projects, predicts W. Benton Harrison, vice president-finance, Sylvania Electric Products Inc., New York. The big push to harness the atom for industry will begin by 1960, he says. "In 1980 the atomic energy industry of the U.S. will be handling an annual volume of business measured in billions of dollars. The potential annual fuel cycle market will be nearly $2 billion in electric utility generating stations alone, including U.S. and Free World countries," Mr. Harrison concludes.

Straws in the Wind

Walter Reuther says 1958 will see the United Auto Workers get their biggest wage increase in history . . . Lincoln Electric Co. this year split a profit sharing pie of $7.5 million among 1378 employees . . . To meet the tight money situation, more companies are leasing material handling equipment . . . Births in the U.S. this year will set an all-time record of 4.2 million . . . Koppers Co. Inc. expects sales of its engineering and construction division to hit $70 million in 1956.



Awaiting your call—you get some idea of the huge sheet and coil stocks on hand at Ryerson from this photo of just one of many Ryerson warehouse bays devoted to flat rolled steel.

On sheet and strip requirements...

are YOU getting this 3-point service?

Sheet and strip buyers tell us that three kinds of purchasing help keep them coming back to Ryerson:

1. WIDER SELECTION OF TYPES—More than 20 kinds of sheet and coil stock are on hand in an unusually wide range of gauges—making it easier to get the exact steel needed for any requirement.

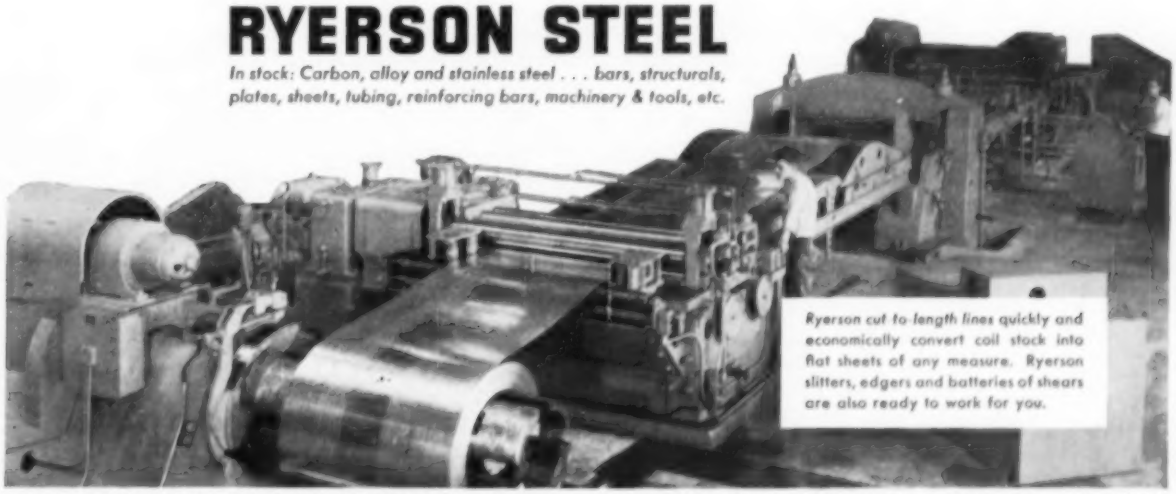
2. GREATER PROCESSING CAPACITY—The most extensive cutting and processing facilities in the steel-service industry enable buyers to get quickest service on requirements for special sizes, strip and sketch cutting, blanks, slit coils, edging, or any other processing.

3. HELP ON SHEET AND STRIP PROBLEMS—The large Ryerson staff of sheet and strip specialists gives buyers a valuable source of help in selecting the most satisfactory and economical stock—or in solving any other problem of application and fabrication.

In addition, sheet and strip buyers like the good packaging, the dependable weight and on-schedule delivery that they get from Ryerson—and the convenience of one-order buying of all steel products from the same source. So call your nearby Ryerson plant for 3-way help on sheet and strip needs.

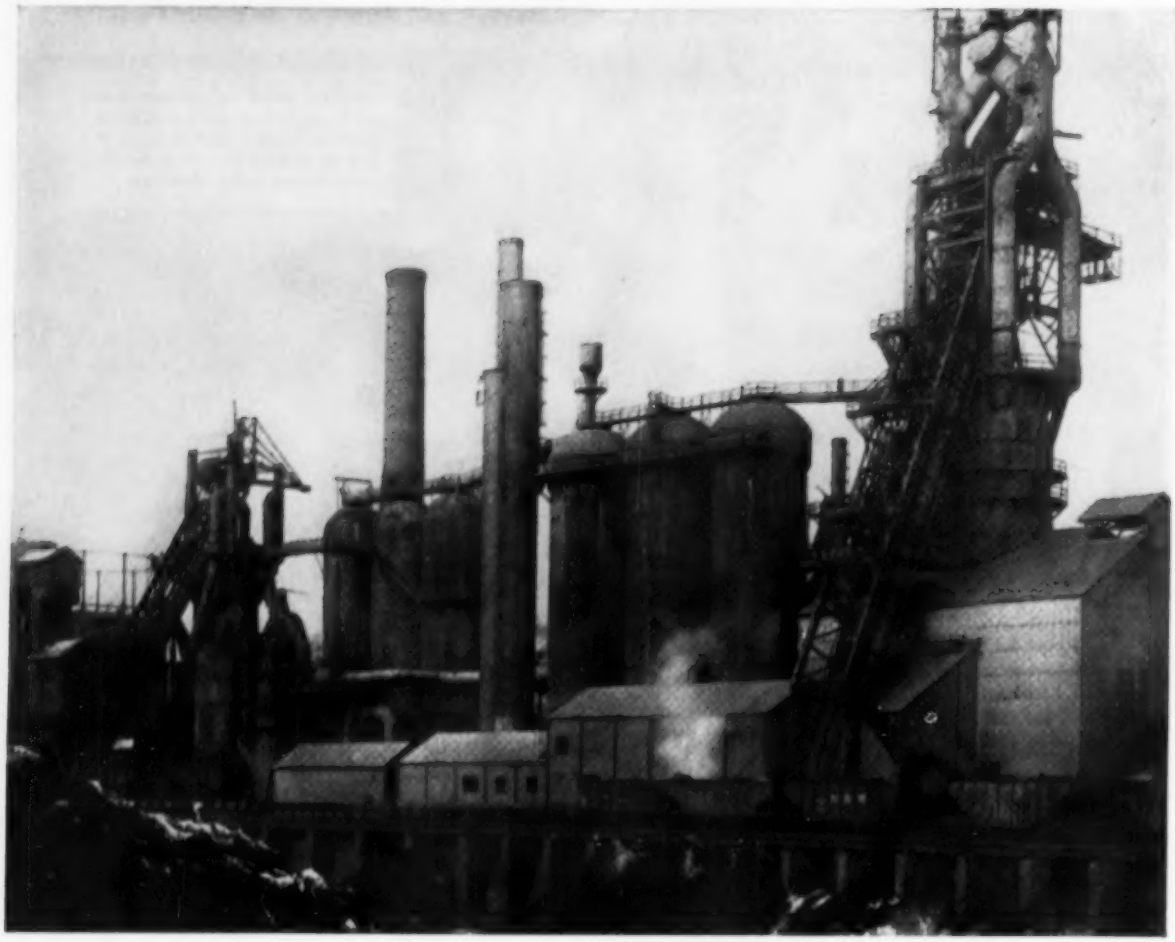
RYERSON STEEL

In stock: Carbon, alloy and stainless steel . . . bars, structurals, plates, sheets, tubing, reinforcing bars, machinery & tools, etc.



Ryerson cut to length lines quickly and economically convert coil stock into flat sheets of any measure. Ryerson slitters, edgers and batteries of shears are also ready to work for you.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE



Season's Greetings

to

our customers and suppliers
who helped make 1956
another good year for DSC

Customer
Satisfaction
is Our
Business

The above is a view of the two blast furnaces at our Portsmouth (Ohio) Division. At the left is the original 700 ton furnace. At the right is the new 1,400 ton furnace, one of the industry's largest

DETROIT STEEL CORPORATION
DETROIT 9, MICHIGAN

Problems of Prosperity

We have just read the comments of some 1500 metalworking executives who participated in our annual survey of business expectations for 1957. They make optimistic reading. Three of four expect their dollar sales volume will be higher in 1957 than it was in 1956. Only one in twenty expects it will drop.

Such expectations are normal and reasonable. They're predicated on a modest increase in physical output and a slight increase in prices.

Our respondents believe that demand for the products of metalworking will be sustained pretty much across the board. Few soft spots are predicted. They expect the second half of 1957 to be a little better than the first.

Strong factors most frequently mentioned are the highway building program, the accelerating construction boom, the continued heavy outlay for capital equipment, a favorable domestic political climate, fairly stable labor conditions in the major industries because of long-term wage agreements, and the coming into production of more efficient equipment (installations that were started a year or two ago). Finally, and perhaps most important, many companies are counting heavily on new products, the result of latter-day technology.

Worrisome factors are mentioned, too, but not as often as they were in previous postwar surveys. Mostly, they concern the problems of prosperity. Many comment on the effect the tight money policy will have on expansion programs. Some believe it wise and necessary; others are concerned lest it have a heavy retarding effect.

The shortage of engineers and skilled workers is frequently noted. Material shortages, particularly steel plates, shapes and nickel, bother users. Foundries and steel mills are worried about high scrap prices. Some companies see their greatest problem in the competition offered by foreign products produced with cheap labor.

Over-all, the comments indicate we will have a good year in 1957 and that metalworking sales again will establish a record.

As a matter of principle, we like to have a little something to worry about. In this year's survey, we can find it only in the unanimity of optimism. We wonder if that may suggest a dangerous complacency.

While we bow to no one in our belief that metalworking is heading toward a fabulous future, we think that future is far from automatic. To achieve it, metalworking management will have to avoid complacency. It will have to keep its muscle tone firm.

Walter J Campbell

EDITOR

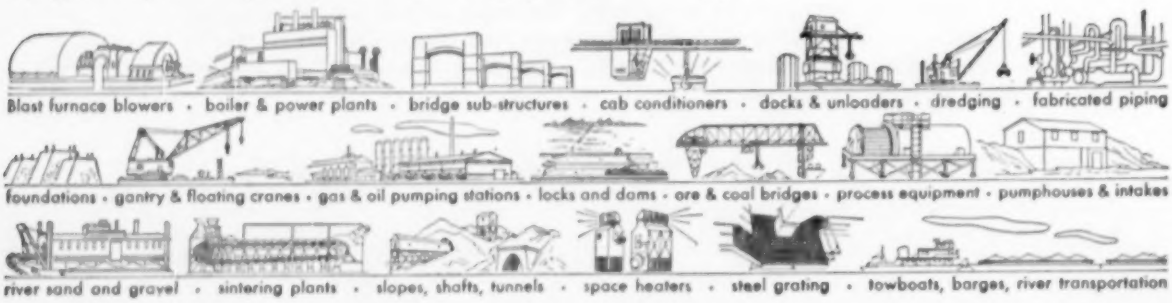
Unique "PUSH-PULL" boat hauls twice as much oil . . . FASTER

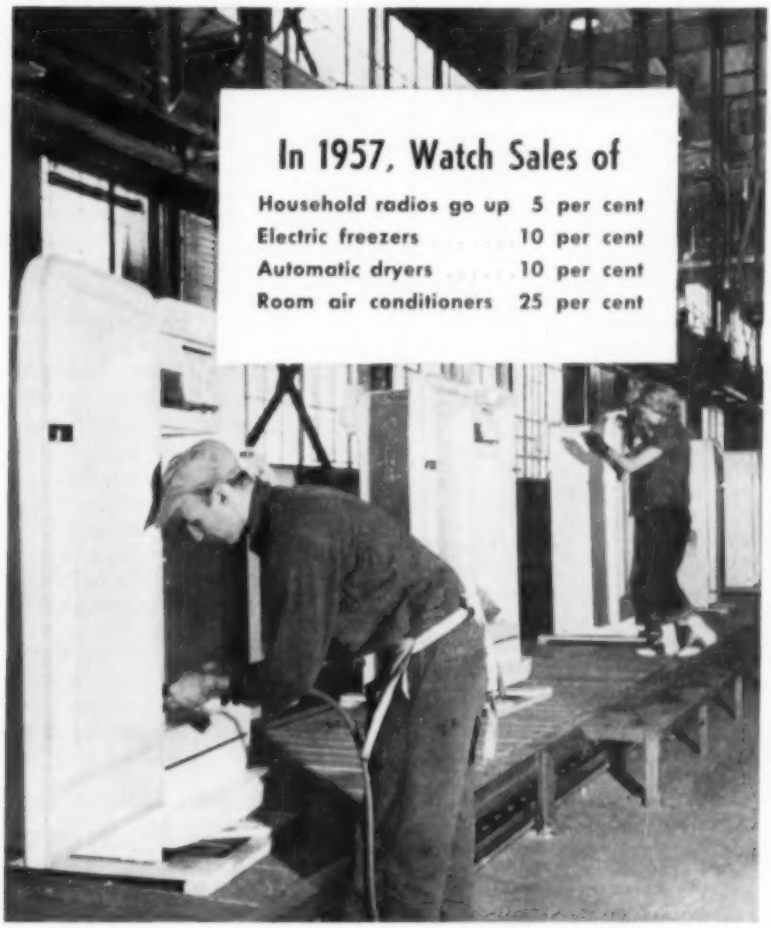
East coast barge transportation presents unusual problems. Routes traverse both open and sheltered sections of the intracoastal waterways. Steuart Petroleum, an oil products marketing company operating in this area, needed to reduce round-trip time and increase the amount of tonnage hauled.

Dravo engineers provided the answer with two integrated tank barges and an unusual combination harbor tug and river towboat, the "Papa Guy." This versatile boat is equipped to pull the specially designed barges on a hawser or push them. Because "push towing" is more efficient, hawser towing is used only during heavy weather in exposed waters. Results? On normal runs, round-trip time has been cut 25% and tonnage per trip doubled.

Dravo shipyards have launched more than 3,700 hulls, providing a solid background for solving marine equipment problems. For information on barges, towboats, or any of the products and services listed below, write DRAVO CORPORATION, PITTSBURGH 25, PA.

DRAVO
CORPORATION


Blast furnace blowers • boiler & power plants • bridge sub-structures • cab conditioners • docks & unloaders • dredging • fabricated piping
foundations • gantry & floating cranes • gas & oil pumping stations • locks and dams • ore & coal bridges • process equipment • pumphouses & intakes
river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation


In 1957, Watch Sales of
Household radios go up 5 per cent
Electric freezers 10 per cent
Automatic dryers 10 per cent
Room air conditioners 25 per cent

Westinghouse Electric Corp.

Appliances: Steady Growth

Don't look for anything spectacular in sales of staple appliances next year. They'll grow some, but the new ones (such as dryers, dish washers) will steal headlines

THE UNSETTLED international situation is tempering the outlook of appliance manufacturers for 1957. But barring a national emergency, industry leaders expect business to be better than it is this year (see table, page 54).

Any lag among particular items this year has been made up by sales gains in laundry equipment, home radios and air conditioners.

10 Per Cent—The year ahead will be one of continued but not spectacular growth, believes John J. Anderson, manager, Westinghouse Electric Corp.'s major appliance division. The largest gains will come in dish washers and laundry equipment. He thinks the new refrigerator-freezers may steal some thunder from freezer sales, while refrigerator and range sales should about equal 1956's.

"The carry-over inventory of finished refrigerators and ranges, as well as materials for finished but not produced items, will influence 1957's sales," he comments. As an industry, he expects major appliances to show a 5 to 10 per cent gain next year.

And by 1960—Herman F. Lehman, General Motors Corp. vice president and head of Frigidaire, says industry sales of the appliances his division manufactures—electric ranges, refrigerators, home laundry equipment, dish washers and dehumidifiers—will probably hit a record 13,815,000 units this year. He looks for 14,750,000 to be sold next year, and about 18 million by 1960.

Newer appliances and new versions of old ones are stimulating the market, he says. While color is "not necessarily sweeping the sales picture," its influence is increasing. "Twelve per cent of one model refrigerator sold this year were in color, and color sales of one range hit 21 per cent," he reveals.

Built-Ins—Like color, built-ins aren't yet a predominant market factor, but they're growing. Frigidaire's sales of built-in ranges this model year accounted for almost 17.5 per cent of all its electric range sales. That's a unit sales increase of 10 per cent over 1955's.

The Gas Appliance Manufacturers Association believes built-in ranges will hit sales of 160,000 units this year, compared with 100,000 last year. Best guess for 1957 is 200,000 units.

Cleanup—One bright spot in "an uncertain future," says James M. Skinner Jr., president, Philco Corp.: Production and sales of home laundry equipment. "The market is wide open, compared with that for the refrigerator," he says. No decline should be felt because of fewer home starts in 1957. "Consumer acceptance of automatic washers and dryers is growing by leaps and bounds," observes Mr. Skinner.

He feels the industry as a whole is suffering from overcapacity:

Appliance Trends Mixed, But Upward

Factory unit sales

	1957	1956	1955
Automatic dryers (gas & electric)	1,750,000	1,522,400	1,384,395
Automatic washers	3,413,000	3,390,000	3,082,450
Combination washer-dryers	165,000	100,000	—
Electric freezers	1,100,000	1,000,000	1,000,000
Electric ranges (excluding built-ins)	1,300,000	1,300,000	1,400,000
Gas ranges (excluding built-ins)	2,122,100	2,196,000	2,266,000
Electric refrigerators	3,600,000	3,700,000	4,000,000
Electric water heaters	900,000	874,200	900,000
Gas water heaters	2,820,000	2,837,000	2,748,200
Household radios	8,500,000	8,100,000	7,660,000
Television receivers	7,300,000	7,300,000	7,456,000
Room air conditioners	2,000,000	1,600,000	1,270,000

Sources: STEEL estimates for 1957, 1956; manufacturers associations supplied 1955 figures.

"However, we believe this situation is being remedied."

Cooling Off—Sales of room air conditioners will hit a record 1.6 million units this year, despite a cool July and August over most of the country, notes George S. Jones Jr., managing director, Air-Conditioning & Refrigeration Institute. Replacement sales ran about 10,000 units.

Manufacturers' shipments of compressor bodies (used in air conditioners and refrigerators) will be up 33 per cent this year, says Mr. Jones. The type used for automobile air conditioners showed even greater gains.

Note the gas industry's increasing interest in gas powered air conditioning equipment. Sales will counteract the normal dip in the industry's summer load. A few companies that make conventional air conditioning equipment are producing gas-powered units.

Saturated—Better than 90 per cent of U.S. families own refrigerators, but the replacement market is picking up strength. J. L. Johnson, vice president and general sales manager, Gibson Refrigerator Co., a division of Hupp Corp., figures that the industry's sales next year may be a little better than the 3.7 million sold this year. They should hit 4 million in a few years and go on to 5 million or 6 million by 1966, he believes. The replacement market accounted for 54.5 per cent of this year's sales; ten years from now replacements may account for over 75 per cent of sales.

Only 17 of every 100 families own freezers; the saturation point is a long way off. This year's sales total (1 million units) should be doubled by 1966, says Mr. Johnson.

Eye and Ear—Dollar volume and profits of television manufacturers are off in 1956. Unit sales may fall behind 1955's record 7,456,000. Tough competition has forced dealers to maintain high inventories—prices have been cut to get out from under them. Increased popularity of portable television has been at the expense of the more costly (and profitable) conventional sets.

More profits should come next year, if not more unit sales, because color television sales will be up. Between 150,000 and 175,000 color receivers were sold this year. Perhaps dealers can push 250,000 next year.

Twenty manufacturers left the field this year because of intense competition. From 1952 to 1956, about 75 firms pulled out. About 50 are in the business now. (The struggle has been less pronounced in the radio business. The field has dwindled from 100 manufacturers to about 75 in the last four years.)

Here's a projection of color television sales for the next decade from Frank W. Mansfield, director of marketing research, Sylvania Electric Products Inc.: 2.2 million units by 1960; 5.1 million by 1963; 7.9 million by 1966. In ten years, black-and-white sales will fall to 2.6 million units.

Ear Alone—Mr. Mansfield figures home radio sets should be selling at a rate of 9.6 million annually by 1966. Sales this year are about 8.1 million, compared with 7.7 million in 1955. Look for 8.5 million to be sold in 1957.

Possibly 80 per cent of this year's business is in replacements, say some experts. Transistor sets are buoying the market.

On top of home set sales, you have car radios selling at a rate of 4.8 million this year. Look for 1957's sales to be around 5.5 million (depending on sales of new autos).

Summary—Executives of General Electric Co.'s appliance and television receiver division are forecasting: The major appliance industry will finish 1956 with sales about 5 per cent above 1955's. Look for a 6 per cent increase from 1956 to 1957. "There should be substantial sales gains in room air conditioners, dish washers and garbage disposers," they conclude.

Clark Bros. Buys Tools

Clark Bros. Co., Olean, N. Y., will spend $2.7 million for expansion next year. J. N. MacKendrick, president, says a welding shop will be added, and new tools and foundry equipment purchased.

American Chain Expands

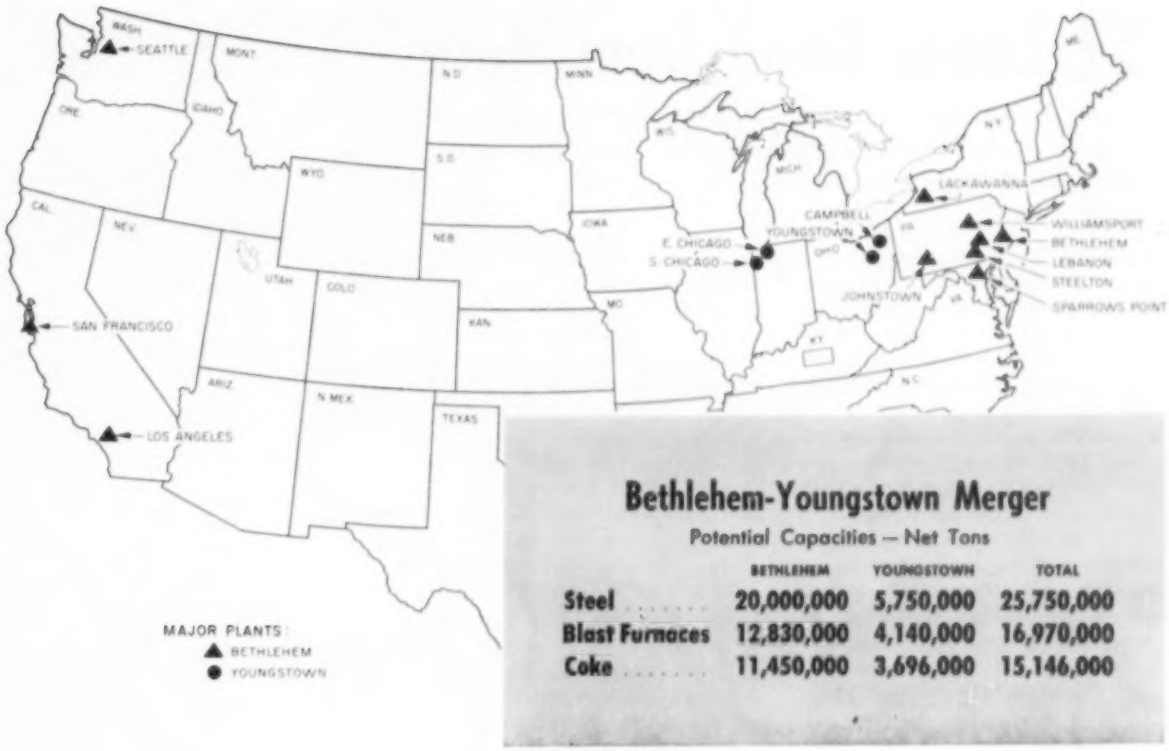
American Chain & Cable Co., Bridgeport, Conn., has started a two-year expansion and modernization program at its Wright-Manley facilities at York, Pa.

First phase of the project is a 20,000 sq-ft building for receiving and raw stores.

Armco Adds Fabricating Plant

Construction has started on Armco Drainage & Metal Products Inc.'s fabricating plant in Springfield, Ill.

S. R. Ives, president of the Armco Steel Corp. subsidiary, says the 30,000 sq-ft plant is four times larger than the present facility. Employment is expected to double.



Bethlehem-Youngstown Merger

Potential Capacities — Net Tons

	BETHLEHEM	YOUNGSTOWN	TOTAL
Steel	20,000,000	5,750,000	25,750,000
Blast Furnaces	12,830,000	4,140,000	16,970,000
Coke	11,450,000	3,696,000	15,146,000

Merger: New Markets for Bethlehem

BETHLEHEM STEEL CORP. will be a truly national steel company if the courts approve the proposed acquisition of Youngstown Sheet & Tube Co.

The above map shows how Bethlehem-Youngstown facilities will be within marketing distance of virtually every important consuming area in the U.S. That's the major significance of the step the two companies announced Dec. 11 that they would take, after hesitating since 1954.

Speed—U.S. reaction was fast. The Justice department filed Dec. 12 with the U.S. District Court for Southern New York to stop the acquisition on grounds that it violates Section 7 of the Clayton Act. Another hurdle that may trip the deal could be minority stockholder objections.

Bethlehem - Youngstown's combined ingot capacity of 25.75 million tons will be boosted by 7 million tons over the next few years if the combine is approved. Bethlehem already has authorized a 3-million ton expansion in its facilities and Youngstown a 1-million ton boost. In addition, Bethlehem proposes spending $350 million on Sheet & Tube properties to add 3 million ingot tons—2 million in the Chicago area and 1 million in the Youngstown district. The accent in that expansion would be on structural capacity.

Benefits — The new combine would have the benefit of added capacity, better capital backing to permit more expansions and a greater depth in management. The merger would also put Bethlehem more solidly in two big markets—automotive and oil country goods.

Some 41 per cent of Youngstown's production is sheet and strip, the big items for auto use. That factor, plus Sheet & Tube's location, will spur Bethlehem's auto business. Some 29 per cent of Youngstown's production is for tubular goods, particularly seamless pipe used in oil operations. Bethlehem makes pipe, but not the seamless type.

No.2 — The merger would still leave Bethlehem as the second largest steel producer, but with 20 per cent of the nation's ingot capacity. U.S. Steel Corp. has 30.6 per cent. Republic Steel Corp. would remain as the third largest with 8 per cent.

In the first nine months this year, Bethlehem's sales were nearly $1.7 billion and Youngstown's $467 million for a $2.1-billion total. U.S. Steel's sales were $3 billion for the period. Combined Bethlehem-Youngstown assets as of Jan. 1, 1956, were $2.6 billion, compared with U.S. Steel's $3.6 billion.

Close — The idea of combining the companies dates back to the 1920s, but the attempt then was unsuccessful. Yet, the relationship between them has been close ever since. One example: They are partners in Erie Mining Co. to produce taconite. Bethlehem owns 45 per cent of Erie, Youngstown 35 per cent, Interlake Iron Corp. 10 per cent and Steel Co. of Canada 10 per cent.

'57 Looks Good from Here

Strongest areas of the economy will be steel and electronics. Farm equipment sales should improve. Look for construction to be bolstered by the highway program

A FEW soft spots mark the outlook for 1957, but business leaders are generally optimistic, reports U.S. Chamber of Commerce.

Credit, housing and autos are regarded as possible questionable areas of the economy.

Experts Say—The strong finish of 1956 should carry over into 1957, believes Emerson P. Schmidt, chamber economist. "We can view 1957 with cautious optimism. The fundamental forces of long run expansion are strong." If federal money policies are continued, he sees prices generally holding firm, though some may hop around more next year than they did in 1956.

Construction—The building picture for 1957 looks bright to Edmund R. Purves, executive director, American Institute of Architects. Building costs are continuing to rise, but architects look to prefabricated components as a positive way of cutting costs. Tight money, adds Mr. Purves, is mainly hurting those builders in speculative home and commercial building.

Housing — The eighth consecutive year of 1-million housing starts is forecast by Nathaniel H. Rogg, economist, National Association of Home Builders. The year will start off at a lower annual rate, but will pick up if more money becomes available for mortgages. "We may not be as robust as we were in 1955, but we're a long way from needing crutches."

Highways — A $500-million increase in road building expenditures for the second year in a row is looked for by Louis W. Prentiss, executive vice president, American Road Builders' Association. That will mean a $5.6-billion year; add to that $3 billion for highway maintenance. Equipment purchases will total about 144,000 units worth $1.2 billion. The credit situation and supplies of steel and cement are problems to be watched in this area.

Automobiles — Passenger car sales next year will be 6 million to 6.2 million, says Paul E. Herzog, director of research, National Automobile Dealers Association. Reasons for confidence: Genuinely new models, lower dealer inventories and better factory-dealer relations. "It may be that a buying splurge is on its way," he adds.

Steel—William Story, Institute of Scrap Iron & Steel, says: "The outlook for production and profits is good." He sees a strong first half and a weaker second half, with total production about the same as this year's.

Farm Equipment—Sales will be up 15 per cent, according to W. R. Noble, general counsel, National Retail Farm Equipment Association.

Electronics — A 10 per cent growth is predicted by James D. Secrest, executive vice president, Radio-Electronics-Television Manufacturers Association. Factory sales in 1956 were about $5.9 billion; distribution, service and broadcasting added almost an equal amount to industry revenue. Mr. Secrest sees a continuing rise in military spending for electronics.

Credit—Next year, salesmen will work harder, particularly in hard goods lines, says William J. Cheney, executive vice president, National Foundation for Consumer Credit. In general, though, he sees a good year ahead.

Ferro-Alloys Builds

Ohio Ferro-Alloys Corp., Canton, O., will build a plant near Clarington, O., next year. The river site is about 30 miles downstream from Wheeling, W. Va.

Estimates put the cost above $3 million. The layout of furnaces, electric facilities and related equipment will be arranged so capacity can be tripled in the future.

Initially, about 150 men will be employed to produce silicon alloys to serve aluminum reduction plants building along the Ohio river.

And it will be close to the steel producing centers along the upper reaches of the river.

Norton Expands

Its electric furnace plant in Alabama will make high-temperature, wear-resistant materials

NORTON CO., Worcester, Mass., is moving farther into the chemical, nuclear and high temperature fields.

A new $2,250,000 plant at Huntsville, Ala., is producing fused magnesia, fused zirconia, boron carbide and fused alumina. Later, it may make aluminum oxide and silicon carbide. Most of those products will be shipped to Worcester for further processing. Some will be sold directly to other users.

Reason—"With the tremendous expansion of U.S. industry in chemical, nuclear and high temperature fields," says Howard J. Daly, vice president of the company's Electro Chemical Division, "a new potential was offered in the area of our furnace know-how."

To begin with, the Huntsville plant has five electric arc furnaces and two electric resistance units. Norton's know-how dates from 1901 when it began using electric furnaces to make materials for grinding wheels and refractories. Until now, the company has produced its refractory raw materials at electric furnace plants in Canada. The Alabama location marks a "step in the diversification of our rather concentrated furnace facilities," says Mr. Daly.

Expansion—The Huntsville plant can be expanded because it's on a 195-acre tract. Norton's president, Milton P. Higgins, reveals the company had to look to new sites for expansion because its other plants are expanded about to the limit. The markets for Norton's products (abrasives, grinding wheels, grinding and lapping machines, refractories, pressure-sensitive tapes) have also moved westward.

At the time of the Alabama plant opening, Norton was authorized by the Atomic Energy Commission to exchange information and services with Canada for civilian uses of atomic energy.

Inland Steel Products Co.

Multifloor office buildings highlight trend as . . .

Cellular Flooring Gains

A CONTINUING high level of industrial construction will assure the steel flooring industry of a banner 1957.

Its chief products are floor plates, open and cellular type flooring. Floor plates are the best known and most widely used. The cellular type is the newest. It will keep increasing its share of the market in 1957.

Floor Plates—Four major steel companies roll them in a variety of patterns and sizes. Good structural strength and their nonslip qualities are their main advantages.

Notes one producer: Before 1955, sales for maintenance and repair accounted for 54 per cent of the market; original equipment, 33 per cent; new construction, 13 per cent. In 1956, the new construction figure was much higher.

Open Type — About 15 firms make open type steel flooring or grating. It is lightweight, easy to paint and nonslip. Blaw-Knox Co., Pittsburgh, figures volume in 1957 will match 1956's, while Standard Steel Spring Division, Rockwell Spring & Axle Co., Coraopolis, Pa., thinks sales may increase.

Globe Co., Chicago, is just entering the welded grating field.

Cellular Type—This product is produced in several variations by eight companies. Formed from galvanized sheets into sections, it provides cells which can be used as raceways for electrical and telephone wires. One manufacturer reports its cells can be used as heating and air conditioning ducts; another producer will provide this feature by the summer of 1957.

Advantages—With cellular flooring, says Inland Steel Products Co., Milwaukee, the floor installation can proceed with the structural frame, and concrete fill can be placed and cured rapidly without shoring.

Comments H. H. Robertson Co., Pittsburgh: The cellular type is lightweight and economical. Its cellular structure provides a built-in safeguard against electrical obsolescence.

R. C. Mahon Co., Detroit, concludes that sales of this type may increase 50 per cent in 1957. The firm looks for cellular steel flooring to be increasingly popular in multifloor office buildings, schools, auditoriums, gymnasiums, laboratory buildings, hospitals and telephone exchanges.

Chart-Pak Moves To Expand

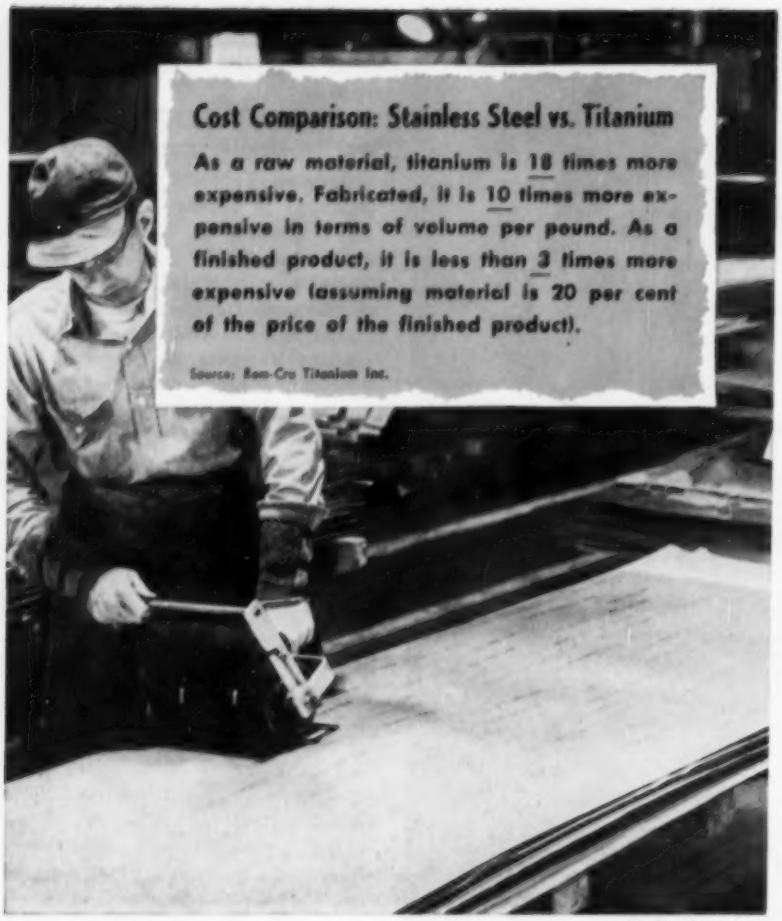
Production facilities and executive headquarters of Chart-Pak Inc., Stamford, Conn., will be moved to Leeds, Mass., (a suburb of Northampton) early in January.

The building, now under construction, will be four times the size of the company's present plant. It will enable the firm to broaden its coverage of the visual aids field.

Victor Opens New Building

Victor Equipment Co., San Francisco, has built a 40,000 sq-ft plant at Norwalk, Calif., for its Alloy Rod & Metal Division. Hardfacing welding rods and other products will be made.

Facilities for coating the rods are air conditioned and humidity controlled.


Cost Comparison: Stainless Steel vs. Titanium
As a raw material, titanium is 18 times more expensive. Fabricated, it is 10 times more expensive in terms of volume per pound. As a finished product, it is less than 3 times more expensive (assuming material is 20 per cent of the price of the finished product).
Source: Rem-Cru Titanium Inc.

Republic Steel Corp.

Big Spurt in Titanium

Ingot capacity may reach 30,000 tons by 1957's end. Shipments of sheets, bars, billets, forgings may exceed 10,000 tons, double 1956's rate. DuPont sees greater civilian uses

TITANIUM is becoming a civilian.

Each price reduction on mill products brings new nondefense users into the fold at a growing rate, though aircraft will continue to be the bread-and-butter market for the industry for some years ahead.

Consumers — Corrosion resistance is the big attraction for the civilian user. The most important potential is in these industries: Chemical, food, paper and pulp and pharmaceutical. Electric power and electronics are good prospects.

Cost is still the big barrier (see the accompanying comparison), but producers can cite impressive case studies of savings.

Those are some of the points made at a symposium on titanium which E. I. du Pont de Nemours & Co. Inc. put on primarily for its engineers. The idea: To acquaint them with cost cutting opportunities via titanium throughout Du Pont's chemical empire. The company also has a parental interest in sparking acceptance of the metal by its own engineers: It is a big producer of sponge which it sells to most mill product makers.

Savings—By educating its technical people, Du Pont expects to get more cost cutting examples like these: A titanium valve that lasted 1680 hours in an application where a stainless steel valve stood up only 70; a titanium part in another application that showed no signs of pitting although a stainless part pitted in 30 days; a $300 titanium thermowell that is as economical as a $95 stainless part because of its increased service life.

Titanium producers admit the metal is no cure-all. "But it does solve many problems," points out D. W. Kaufmann, sales manager, Rem-Cru Titanium Inc.

Prices—The cost of titanium has been cut in half in the last five years. But it's doubtful that big reductions will come in the near future. The batch production method and rolling problems are the bottlenecks. A major technological breakthrough apparently will have to be made to bring a significant price drop.

Good progress is being made in fabrication. An indication: Competition has arrived for such jobs.

Progress in extrusion is reported by H. J. Mattes, metallurgical engineer, Republic Steel Corp. (See STEEL, Dec. 10, p. 142). Die materials and lubrication still have to be improved though.

Project—Volume casting looks about four to five years away, says A. L. Feild of Du Pont. The snag is the metal's high reactivity at elevated temperature. Reaction with the mold material results in bad castings. Some progress has been made with small castings, using an experimental Du Pont graphite powder refractory.

Conclusions of the symposium: 1. Nondefense use is becoming a significant factor in the titanium business, but such consumption is still well below what the government allows. (Producers can set aside 10 per cent of their output for civilian items.) 2. As its price continues to drop, titanium will take a major place as an industrial construction material.

The industry's attitude is perhaps summed up by L. S. Bush, director of research, Mallory-Sharon Titanium Corp.: "We're going fast, but faster advances must be made."

More Records for Capital Spending

(New plant and equipment expenditures in millions of dollars)

	1st Quarters		
	1957*	1956	1955
Manufacturing	3,812	2,958	2,249
Durable goods industries	1,915	1,462	1,063
Primary iron & steel	350	219	154
Primary nonferrous metals	145	69	41
Electrical machinery & equipment	153	104	89
Machinery, except electrical	286	227	158
Motor vehicles & equipment	370	341	224
Transportation equipment, excluding motor vehicles	165	77	48
Stone, clay & glass products	149	132	88
Other durable goods	297	293	260
Nondurable goods industries	1,897	1,496	1,186
Mining	300	262	186
Railroad	392	297	179
Transportation, other than rail	445	396	359
Public utilities	1,159	936	845
Communications	2,609	2,613	422
Commercial & others			1,608
Total	8,717	7,462	5,847

*Estimated.
Source: Commerce department, Securities & Exchange Commission.

Boom Pressure Still On

TALK of a slump in 1957 doesn't gain any support from the latest Commerce department and Securities & Exchange Commission report on capital spending.

The first quarter of 1957 will see spending for new plants and equipment at an annual rate of $38 billion. Compare that with first quarter rates of $32.8 billion in 1956, and $25.7 billion in 1955. Another point: First quarters don't match the yearly pace. Total expenditures in 1956 were $34.9 billion; in 1955, $28.7 billion.

If 1957 should show a similar rising rate, the total spending will be around $41 billion.

Leaders—Among manufacturing industries, durable goods producers are expanding faster than nondurable goods. In nonmanufacturing areas, railroads lead the field. Expenditures by railroads in the first quarter of 1957 will be 23 per cent above those in the first quarter of 1956.

Spending by all U.S. business will be 16 per cent better in the first quarter of 1957 than in the first quarter of 1956, and 8 per cent above 1956's quarterly average.

In metalworking, primary nonferrous metals producers will spend more in 1957's first quarter than in any quarter of 1956.

Record—If fourth quarter programs are realized, 1956 will finish 22 per cent ahead of 1955, the previous record year for U.S. capital spending. The survey concludes that fourth quarter spending was scaled down from earlier estimates as a result of the steel strike this summer.

NAM Speaks Out

It advocates tax reform, right-to-work laws and broader concepts in marketing

This country must change its theory of taxation completely to escape real trouble later, warns Ernest G. Swigert, newly elected president of the National Association of Manufacturers, and head of Hyster Co., Portland, Oreg.

"The tax system should be designed to raise revenues, nothing else," he declares. "We have gradually adopted a tax system that is devised . . . to reform society, to remold our lives."

Agenda — Taxation, marketing, management-labor relations and other managerial and economic problems came in for searching discussion at the association's 61st Congress of American Industry in New York.

Right To Work—Dr. Leo Wolman, professor of economics, Columbia University, said "right-to-work laws are a good American right. The monopolistic power exercised by organized labor is no longer an issue to be shrugged off—it is a matter of grave public concern."

Slipping—A decline in the rate of growth of productivity was indicated in a panel discussion on inflation. The long-term rate, it was pointed out, is somewhere between 2 and 3 per cent. In some of the postwar years, the rate ran as high as 3 to 4 per cent. Within the last 12 to 18 months, the rate has dropped to 1 to 2 per cent, it was claimed.

Principles — David F. Austin, commercial vice president, United States Steel Corp., outlined what he regards as fundamental marketing principles: 1. Only a fully integrated marketing program can achieve maximum success. 2. The only right price is a fair price—fair to seller and buyer alike. 3. There is no such thing as a one-time buyer for any product. 4. The seller's responsibility is discharged only when the product has served the ultimate consumer satisfactorily. 5. Sales effort must be applied along the entire distribution chain—he regarded this as the most important point of all.

Look for Action on the Elephant Tool Program

HOPES are high for a revival of the government's elephant tool program, although it's pretty well bogged down now. There are many problems: 1. Government personnel involved have been tied up with other work. 2. Machine tool builders reportedly are showing only small interest in the plan because of present high business levels. 3. No one has come up with a good list of what tools are needed. The result is "misunderstanding, confusion and lack of co-operation," says one source.

How Do You Keep Up with Progress?

Weapon systems are changing so fast that few Pentagonians want to be pinned down about what tools will be needed to produce them. Still fewer want the responsibility of acquiring big expensive tools like the elephants when there's a chance they may no longer be needed even before they can be completed. But there will be enough people convinced of the need for an elephant tool program that some activity will be under way in a month. Firm orders for tools are farther away.

Senate Committee Threatens Controls

Who's got the nickel? The Senate small business committee doesn't like what it has seen since it began looking into the situation last February. Look for more checkups. The committee recommends that the Small Business Administration be authorized to develop data showing where the nickel goes so the government can be sure small business is getting its share. Such data, the committee says, could be used to determine whether controls are needed. The matter probably will be put before Congress early next year. The committee does not recommend controls at this time. It does point out (and this could be a veiled threat): "All the evidence envisaged by the Defense Production Act for the imposition of controls is even now present in the nickel market."

Senators Prefer Revised Allocations

Platers have complained they weren't getting a fair share of nondefense nickel; that's how the Small Business Committee got into the act. Conclude the senators: 1. Platers are getting their share. (Statistics show some improvement in the first half of 1956, although that may be just a seasonal trend. Platers claim they always get more in the first half.) 2. The allocation system now in use by nickel suppliers should be revised. 3. Recommended: More Office of Defense Mobilization interest in the allocation of nondefense nickel.

Little Hope for Tax Cuts

Tax and labor legislation will take up much of Congress' time in the coming year. Chances for tax reductions grow slimmer with each new guess of increased defense spending and each pronunciation of the need to hold down inflation. Prospects are better for some moves toward simplifying the 1954 code: To eliminate loopholes; to revise those parts dealing with corporate organizations, liquidations and partnerships, and those dealing with income tax treatment of estates and trusts. Tax relief for small business will get an airing but positive action is a question mark.

Some Labor Law Changes?

Outright repeal of the Taft-Hartley act is improbable, but there will be hassles on the right to work and secondary boycotts. Also coming up: Preliminary action on union health and pension funds, labor racketeering and labor and corporate contributions for political purposes.

Meet Jack Howard Smith: East Central District sales manager of the Wolverine Tube Division, Detroit, of Calumet & Hecla Inc., Mr. Smith will serve for about six months as director of the Business & Defense Services Administration's Copper Division.

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Specially treated Sirvis-Conpor members available in C/R Oil Seals greatly reduce torsional drag, won't score shafts. They provide positive sealing over longer service life, are completely self-lubricating. Write for detailed information.

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The wide range of Conpor treatments . . . from practically unfilled to virtually non-porous leather permits packings with exact leakage and lubrication control, increased life. Stable in a wide variety of oils, gases, solvents.

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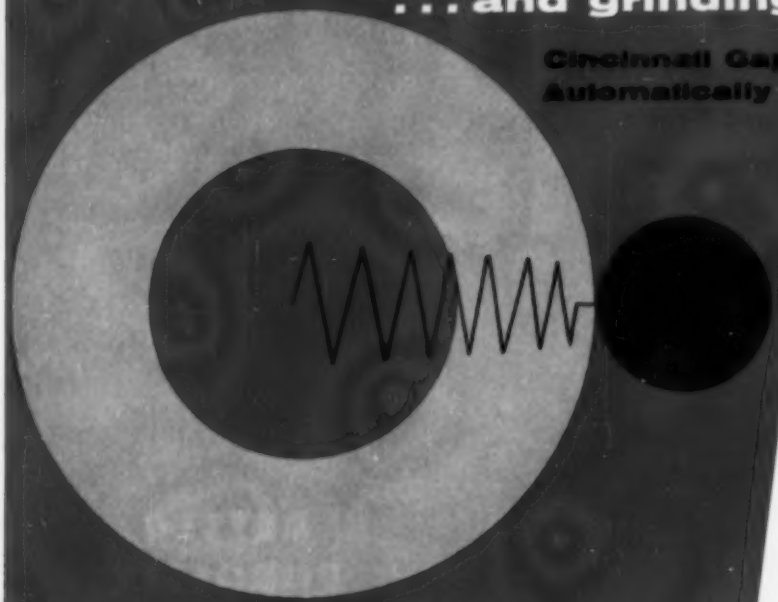
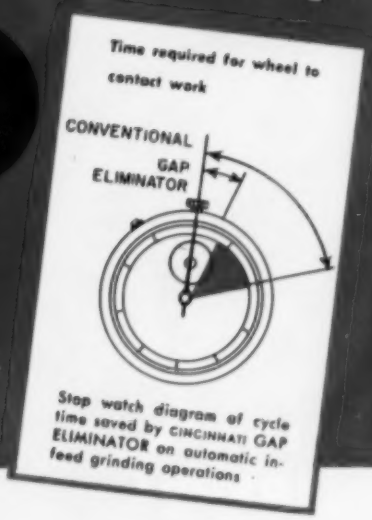
Where Seconds Count

. . . and grinding stock varies

Cincinnati Gap Eliminator Automatically Speeds up the Cycle

CINCINNATI





Stop watch diagram of cycle time saved by CINCINNATI GAP ELIMINATOR on automatic infeed grinding operations

CINCINNATI FILMATIC 6"R x 18" Plain Hydraulic Grinder

GAP ELIMINATOR, Push-Button Automatic Infeed, Air-Electric Gage Sizing (with Cycle Time Stabilizer) and other cost-reducing features are included in the CINCINNATI FILMATIC 6"R x 18" Plain Hydraulic Grinder illustrated above. There are four sizes in the line:

Size	Between-Center Lengths	Catalog
6"R 10"L	18" and 30"	G-660-1
10"R 14"L	18", 36", 48" 72" and 96"	G-661

FILMATIC

Variations in grinding stock are inevitable. And the wider the variation, the longer will be the cycle for automatic infeed grinding operations . . . more time is lost in "grinding air." Cincinnati has eliminated much of this unproductive time with an exclusive feature — GAP ELIMINATOR — which can be built into most new CINCINNATI® FILMATIC Grinding Machines. Briefly, here's how it works:

> The wheelhead advances toward the work at a rapid rate. At a predetermined point in the cycle, the rapid rate changes to an intermediate infeed rate. Instantly upon contact of the wheel and work, the normal grinding rate takes over, and the cycle continues to completion.

A few seconds saved each cycle can mean big dollar savings on your cost records. ¶ Ask for a visit by one of our field engineers. He will explain more about the Gap Eliminator, and chances are he can show you how to save money on your precision grinding operations.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

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L-R's Rizzo: Expansion with Restraint

"WE ARE the Tiffany of the commercial heat treating industry," says Frank Rizzo, president, L-R Heat Treating Co., Newark, N. J.

"While unit costs are higher, each customer saves money in the long run," explains the young (39) executive.

"Use of modern heat treating equipment and inspection control methods almost eliminate rejects caused by the failure of heat treating methods."

Customers—This 14-year-old company serves more than 1000 customers who have accepted this philosophy. The product mix ranges from fasteners to 2200-lb castings. Mr. Rizzo adds: "We have some large customers who would like to take over our entire production time, but we don't allow any one customer to make up more than 7 to 9 per cent of our total sales volume."

Many firms, with their own heat treating facilities, use commercial heat treaters for overflow or ticklish jobs. "Specialization pays dividends," reports Mr. Rizzo. "The small businessman can pay more attention to details, be more flexible."

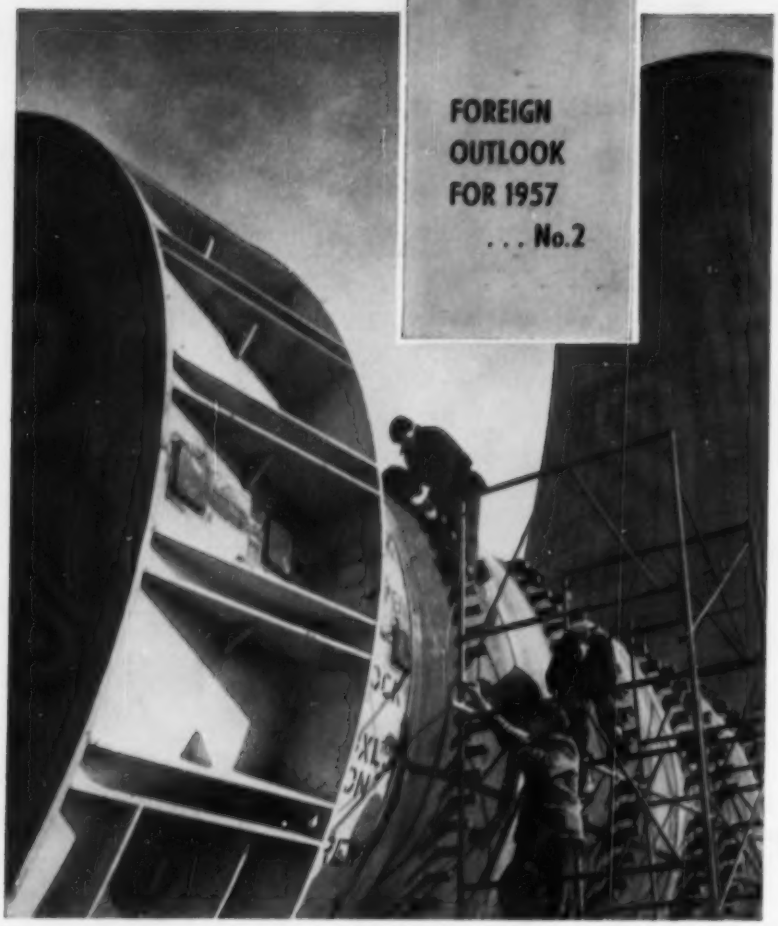
Speed—Service is all important. "By the time components get to this stage," he states, "customers have usually forgotten to allow any production time for heat treating. This means the pressure is on all the time for quick delivery."

Here are some of the rules L-R follows in its approach to satisfying customers: 1. Keep at 100 per cent of capacity, but no more. 2. Use only the regular crew (about 100 employees). Don't hire untrained or extra men to do overflow work. 3. Make realistic delivery estimates. 4. Allow inspection teams to do a thorough job no matter how much pressure is on to "get the job out." 5. Concentrate on gaining customers in a geographical area where transportation time is minimized, and where shipping costs do not eat deeply into profits. L-R serves an area with a radius of about 500 miles, with New York as the central point.

Pay-Off—"We have discovered that, although costs have to be realistic, there is no need for price cutting," reports Mr. Rizzo. Proof: L-R will open new facilities next year, which, it says, will make it the nation's largest commercial heat treater. Sales should grow from about $1.5 million this year to more than $5 million by 1960.

Even though the new plant will give L-R a two-thirds jump in capacity, it is being designed so that it can be operated economically at the same level of business the old plant now carries. "We are confident that this will be a needless precaution," comments Mr. Rizzo, "but small businesses have failed many times because they overexpanded. We don't intend to be trapped."

FOREIGN OUTLOOK FOR 1957 . . . No.2



One steel firm is already using power from Calder Hall atomic plant

Britain's Boom Sags

Her industry counts on automation and increased mechanization to keep it competitive. But the unions are not co-operative. 1957 may be the critical year

LABOR troubles held British steel production to 22.5 million net tons in 1956. About 1.3 million tons of production were lost.

Look for output to increase in 1957; plans for expansion indicate 1958 will see the industry making 26.3 million tons.

Example—The British steel industry is setting an example for the rest of the country to follow. Since 1946, output per man has gone up 46 per cent; since 1938, 66 per cent. This has been done with only a small expansion of the work force.

Britain expects to add only 640,000 persons to her labor force in the next 20 years (an increase of 2 per cent), but she must boost her productive capacity many times to maintain her high export volume. Mechanization and automation are being stressed. A heavier percentage of capital outlay is going in those directions every year.

Exports rose 10 per cent in value and 6 per cent in volume in 1956. Imports were at their lowest level in September since February, 1955, although imports for the first nine months of the year have been running ahead of those in the same period in 1955.

Crisis—The report must be tempered by the Suez crisis. The shortage of fuel oil will cut Britain's industrial production heavily until U.S. shipments make up the difference (see table on page 65).

Britain's exports will fall, rubbing salt into the wound created by the dollar shortage. Until some sort of U.S. financial aid comes through, more dollars must be spent to pay for U.S. oil.

Pickup — The auto industry, which suffered heavily from strikes this year, appears to be headed for better times in 1957. Autos account for 10 per cent of Britain's exports, so even if home consumption is down because of the gasoline shortage, production should stay high.

Heavy equipment makers gained this year by hiring laid-off auto workers (both skilled and unskilled). Exports of ships, aircraft and certain types of machinery have led the parade of increased heavy equipment exports.

The boom in domestic tool orders lagged at midyear as manufacturers sought more export business. In turn, imports of machine tools are expected to decline so dollars can be saved for oil.

New Equipment — The British Board of Trade says expenditures for equipment by metalworking firms will be about 1 per cent higher next year than they were in 1956. Spending for new construction will be down 9 per cent. That represents quite a change from the 27 per cent gain in capital expenditures in the 1954-55 period.

The shipping industry outlook is better than most: Capital spending will be 5 per cent ahead of 1956's. Britain leads the world in shipping construction. Her yards can't promise delivery on new orders until 1962. They are building over 2 million gross tons of shipping.

Exports of aircraft and aircraft engines have increased more than 55 per cent since 1955. The British ship more aircraft products out of the country in two weeks

than any other European country does in a year.

Outlook—But labor will hold the key to Britain's economic health in 1957. While production costs continue to rise, the metalworking unions continue to demand more money. The Trades Union Congress has formally rejected a policy which restrains its wage demands—something the government feels necessary.

Atomic power is another important area of development for Britain. At Calder Hall, the world's first full-scale atomic power for civilian use was turned on by Queen Elizabeth this fall. Atomic power is a necessity for a country whose coal production last year was 18 million tons under 1937's production, and whose oil supply must for the most part come from the uncertain Middle East.

If Britain can get the money, look for a crash program to speed her development of atomic power.

France Faces New Crisis

Gasoline rationing, a heavy cutback in industrial fuel supplies and the growing shortage of dollars add up to toughest winter since World War II

HOW'S FRANCE doing?

The answer depends upon your source of information. Listen to the Organization for European Economic Co-operation: In 1956, France has entered a critical inflationary situation which may make it extremely difficult for her to compete with other countries for foreign markets. Exports this year were 5 per cent below last year's, while imports increased 16 per cent.

But listen to a French business statistician: Industrial production in the first nine months of the year ran 11 per cent ahead of 1955's rate. (The best growth rate of any European country this year.) Steel production will be 14.6 million net tons, compared with 13.8 million tons in 1955 (excluding the Saar). Backlogs of foreign orders for French aircraft stand at $86 million. In the first nine months of the year, France produced more autos and trucks than she did in all of 1954, and the auto industry is running about 14 per cent ahead of its 1955 production rate.

Middle Ground—Put it this way: France is probably in the most precarious economic position of any European country. Since the Algerian war will drain $857 million from the economy in 1956, business must continue good to avoid a tremendous economic bust. There is no middle ground into which France can retreat.

Add the spice of the Suez debacle to this French stew, and you have France's current position: Because 30 per cent of French industry depends upon oil for fuel, the country is in for its coldest winter since World War II.

Headliner—The biggest event of 1956 on the domestic scene is Franco-German agreement on the Saar. Politically, the Saar returns to Germany as of Jan. 1, 1957. France will continue to get 5 million tons of coking coal a year for five years from the Warndt mines. Over the next 20 years, France will be allowed 66 million tons, plus 21 million at cost from the Ruhr.

The two countries have agreed upon construction of the Moselle canal, which will give French industry in Lorraine cheaper access to Ruhr coal sources, as well as a link to northern seaports via the Rhine. Germany will pay 54.5 per cent of the cost of construction; France 45.5 per cent. Estimated savings in freight costs to French industry: $14 million a year. The canal will be operating by 1961.

Outlook—The steel industry is negotiating a government loan of about $64 million to finance modernization projects. The government is encouraging the industry to look ahead to a capacity of 18.7 million net tons by 1962.

The best sign of domestic confidence in the future is the outlook for auto sales. Some popular makes cannot be delivered for a year or more; all manufacturers are confident the market is not saturated. Plants are being constructed; research has been stepped up; more new models are coming.

Suez Timetable . . .

Mar. 1—A channel will be opened to handle ships up to 10,000 tons.

June 1—The canal will be ready for all ships.

How U.S. oil will meet Western Europe's needs . . .

Dec. 17—We are shipping 400,000 barrels a day.

Jan. 1—We will be shipping 500,000 barrels a day.

Feb. 1—We will be shipping 675,000 barrels a day.

Western Europe normally uses 2.2 million barrels a day. Besides the U.S. oil, it will be getting 800,000 barrels via the Cape of Good Hope and 325,000 barrels via pipeline from Saudi Arabia. Total: 1.8 million barrels a day (about 80 per cent of its normal requirements).

How Great Lakes Steel *charts* quality

Left: Thermocouple is inserted into an open-hearth furnace to check temperature of heat. Right: Multiple indicator records open-hearth temperature.

This view shows 12 of Great Lakes 17 open-hearth furnaces. Bright spots are furnaces being charged with pig iron and scrap. The open-hearth process takes from 10 to 12 hours.

This is the business end of a thermocouple, the rugged yet delicately accurate device that measures temperature in an open-hearth furnace. The two fine wires you see above, inside the casing, absorb heat and transmit it as an electrical current to be charted by recording potentiometers.

No chance for guesswork here—through eleven long hours the rising temperature of what will be 500 tons of Great Lakes open-hearth steel is meticulously controlled. Then, at exactly the right time and the right temperature, the glowing molten metal gushes into ladles for pouring into ingots.

The slender, spidery lines on the chart assure another heat of high and uniform quality steel. Quality that is checked and rechecked at every step to assure that customer specifications are met precisely.

Why don't we get together and talk over your steel needs? Some time soon?

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1957 Packard Clipper four-door sedan

STEEL Sees Auto Show

Behind the scenes, auto executives discuss who may go to unit body construction next, how fast fuel injection will catch on, who will get what share of the market

STUMPING the experts was a tough job at the National Auto Show in New York. Industry executives had most of the answers down pat. Only one difference of opinion marred the family holiday:

Harlow Curtice, General Motors Corp.'s president, flatly states that no GM division will use unit body construction in 1958. George Romney, American Motors Corp. head, retorts: "The only reason the Big Three don't go to unit construction is that it will cost millions to scrap tooling and equipment for building bodies and chassis."

Pointers—He indicates that two members of the Big Three are studying AMC cars with the unit body and smallness in mind. "One recently bought a body in white from AMC," reports Mr. Romney. Another company has ordered five Ramblers from a Detroit dealer.

While auto makers are eyeing a smaller car, the present interest in Ramblers makes most experts believe current studies are aimed at the feasibility of unit construction. The rumor is that one company will use it in 1958. Since Mr. Curtice had canceled out GM divisions and since Chrysler Corp.'s 1958 program doesn't include such tooling, Ford Motor Co. is the logical suspect.

Elimination—Some fingers have pointed at the Edsel, but Richard Krafve, Edsel Division general manager, says the E car will be built in Ford and Mercury assembly plants. Continental Mark II body styling is set. A switch here would involve more money than projected output justifies.

Lincoln is left and here's the question: Are enough Lincolns sold to make the move worthwhile? The car was face-lifted for 1957. Division officials admit they expect strong competition from Chrysler's Imperial. So Lincoln sounds like the likely candidate.

Corridor Talk—Fuel injection got more attention in hotel corridors and press suites. As things stand, AMC's Rambler, Pontiac's Bonneville convertible and Chevrolet are offering FI setups. Mr. Romney confirmed reports that the Rambler system will cost "a little less than $400."

A rumor roundup on injectors reads like this: Studebaker-Packard Corp. will make the Mercedes-Benz system available in 1958. Chrysler has two of the devices under consideration—will use them only if forced to by competition. Ford is set with five different types. At least two are electronically actuated. It, too, wants to hold off if possible.

Buick will make a running change to a Rochester Products unit. One GM engineering chief adds: "All our divisions will make fuel injection available in 1957." But availability has many mean-

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Ford's Retractable Hardtop at Auto Show

Operational cycle of retractable hardtop takes 40 seconds. The mechanism works only when transmission is in neutral and ignition key in "accessory" position. Car is 3 in. longer than Ford Fairlane

ings. It may be announced, but you might not be able to buy it.

Party Line — Elsewhere on the show circuit, auto makers are in agreement on 1957 production estimates. Mr. Curtice will hold to his earlier retail sales estimate of 6.5 million passenger cars, 900,000 trucks. Mr. Romney agrees. He adds: "I expect to get a greater share of the market in 1957 than in 1956."

In AMC's 1956 fiscal year (ended Oct. 31), the company accounted for 1.94 per cent of passenger car output. Now the figure is close to 2.4 per cent. Mr. Romney hopes to maintain this pace.

Optimism — Ford believes 1957 sales will hit 6.75 million cars. Henry Ford II, president, says: "We are raising our sights from 28 per cent to perhaps as much as 31.5 per cent of the market in the 1957 period."

He expects most of this increase to come in the Mercury line.

Studebaker-Packard has no additional statements on production, but it, too, is hoping for a 6.5 million market. Harold Churchill, president, does admit: "The Packard Clipper is a part of our previously mentioned aim to have world-wide sales of 153,000 cars and trucks."

Preview—This information came at the preview of the 1957 Packard line. Two Packard models will be offered: Clipper and a station wagon.

Specifications won't be revealed until dealer introductions in mid-January, but it's understood the supercharged 289 cu in. Studebaker Hawk engine will be the power plant. It turns out 275 hp. The Packard Clipper is using Studebaker's classic body. It has a slightly modified 1956 Packard grille. Torsion bar suspension has been dropped.

Production of the car is scheduled to start today (Dec. 17). "We expect to concentrate on the medium price field. This gives us 17 to 18 per cent of the price class coverage instead of less than 2 per cent we'd get in the high price field," states Mr. Churchill.

Trucks—Cars weren't the only attention getters at the show. One floor of New York's Coliseum was devoted to trucks. Diamond T Motor Car Co., Chicago, has an interesting demonstration to show off its 723 CJT. This cab-over-engine tractor sports a manually operated lift cab rather than the hydraulic type used by White Motor Co., Cleveland. It's in the 23,500-lb-and-up class.

Storrs Baldwin, assistant to the president, explains the cab is carefully counterbalanced.

Transmission—The Motor Truck Division of International Harvester Co., Chicago, introduced a Select-O-Matic transmission for heavy duty IH trucks. It features an electrohydraulic clutch and a special torque converter. These are combined with a five-speed synchromesh transmission.

The hydraulic clutch is disengaged for shifting by a button under the gearshift knob. IH claims the design of the torque converter will eliminate the need for two speed axles and an auxiliary transmission under normal conditions.

Symposium — Aside from the show itself, several tidbits came from a panel sponsored by the American Society of Industrial Designers, New York. Here is what styling experts said about trends:

William L. Mitchell, GM's director of styling: "General Motors is against drastic changes from year to year which deface the character of cars."

Edmund E. Anderson, AMC's director of automotive styling: "The personal vehicle, the compact car and the large, long distance limousine will be the three major types to dominate tomorrow's market." American Motors aims at the personal market with its Metropolitan; compact car needs are supplied by the Rambler.

U.S. Auto Output

Passenger Only

	1956	1955
January	611,190	659,508
February	554,667	675,495
March	575,559	794,015
April	547,766	753,851
May	471,994	724,892
June	430,141	649,393
July	448,804	659,763
August	401,997	614,493
September	190,709	461,591
October	388,922	517,813
November	581,088†	749,061
11 Mo. Total	5,202,837†	7,259,875
December		682,257
Total		7,942,132

Week Ended	1956	1955
Nov. 10	132,087	180,754
Nov. 17	135,641	179,250
Nov. 24	118,949	151,799
Dec. 1	159,976	177,712
Dec. 8	170,898†	178,409
Dec. 15	175,300*	169,256

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Zinc Moves Up

Use of zinc diecastings has increased about 8 per cent on 1957 cars, says John L. Kimberley, executive vice president, American Zinc Institute, New York. The average '57 will carry more than 65 lb of zinc, compared with 60 lb this year.

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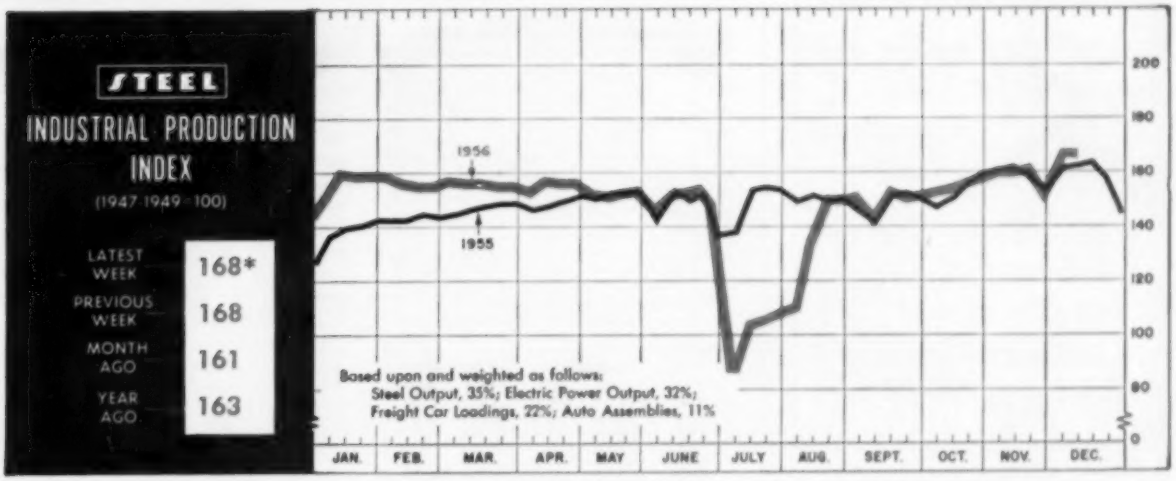

*Week ended Dec. 8.

Production Index Climbs to New High

CHALK UP a record for industrial production! STEEL's index (above) cracked the old high during the week ended Dec. 1 with a revised reading of 168 (1947-1949=100) and followed with the same mark the following week. That's 4 percentage points above the former record which was posted during the Dec. 17 week last year.

Three of the four elements in the index contributed to the advance, but automotive and electric power spearheaded the drive. Comparing the two record weeks with the pre-Thanksgiving week of Nov. 17, here's the way the situation shapes up: Autos and electric power picked up seasonal strength, both contributing about 3 points to the composite. The steel industry, operating at capacity-plus levels since mid-September, boosted its output just enough to add about one-third of a point to the over-all effort. This made up for a seasonal decline in freight car loadings.

Any Higher?—There is a chance that 1956 will climb one or two notches higher on the production scale. Here is why. Past performance indicates that consumption of electricity will continue to rise until the pre-Christmas week. In some respects, this segment of the index distorts the production picture. (A large part of the seasonal increase is caused by longer department store hours and use for Christmas decorations.)

While auto production is already at a 1956 high, it is expected to edge upward as production kinks get ironed out. Ford Motor Co. and General Motors Corp. are pushing the peak levels reached during the 1955 model run. Chrysler Corp., which came up with the most sweeping model changes and the most production problems, still has considerable room for improvement in unit count. With apparently satisfactory customer acceptance and dealers' inventories at moderate to low levels, Detroit will be the big factor in boosting any production indicators higher.

Old Faithful—Steel production

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,511[1]	2,493	2,421
Electric Power Distributed (million kw-hr)	12,000[1]	12,075	11,426
Bituminous Coal Output (1000 tons)	10,935[1]	9,140	10,420
Petroleum Production (daily avg—1000 bbl)	7,150[1]	7,133	6,923
Construction Volume (*ENR*—millions)	$323.3	$377.1	$330.3
Auto, Truck Output, U. S., Canada (*Ward's*)	207,218[1]	196,571	213,561
TRADE			
Freight Car Loadings (1000 cars)	745[1]	752	727
Business Failures (Dun & Bradstreet)	254	207	209
Currency in Circulation (millions)[3]	$31,450	$31,355	$31,070
Dept. Store Sales (changes from year ago)[3]	−1%	+1%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,065	$19,803	$21,591
Federal Gross Debt (billions)	$276.6	$276.7	$280.1
Bond Volume, NYSE (millions)	$38.2	$35.0	$21.2
Stocks Sales, NYSE (thousands of shares)	11,989	11,286	13,093
Loans and Investments (billions)[4]	$86.2	$86.4	$85.3
U. S. Govt. Obligations Held (billions)[4]	$26.1	$26.3	$29.6
PRICES			
STEEL's Finished Steel Price Index[5]	225.92	225.92	208.90
STEEL's Nonferrous Metal Price Index[6]	255.0	256.2	268.3
All Commodities[7]	115.7	115.9	111.1
Commodities Other Than Farm & Foods[7]	124.3	124.2	119.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,895; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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THE BUSINESS TREND

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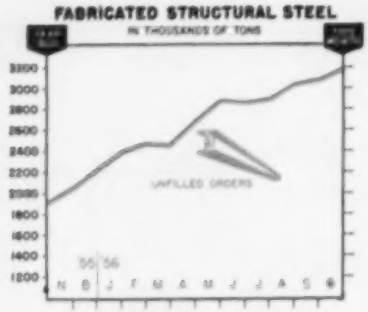
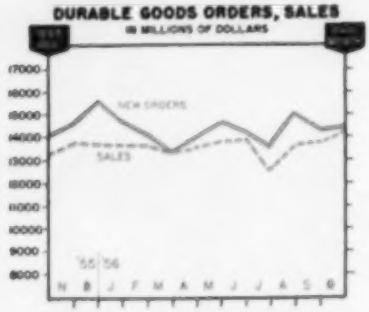


	Shipments 1956	Shipments 1955	Backlogs 1956	Backlogs 1955
Jan.	251.5	225.8	2,408	1,346
Feb.	285.4	213.4	2,476	1,360
Mar.	306.8	227.8	2,463	1,392
Apr.	289.6	239.7	2,687	1,444
May	306.2	223.2	2,896	1,592
June	284.7	282.3	2,859	1,706
July	165.5	219.4	2,904	1,639
Aug.	213.5	268.0	3,076	1,776
Sept.	240.9	289.1	3,108	1,854
Oct.	287.6	283.8	3,215	1,925
Nov.	.....	258.9	.....	2,075
Dec.	.....	248.0	.....	2,242
Total	.....	2,979.4		

American Institute of Steel Construction

DURABLE GOODS ORDERS, SALES
IN MILLIONS OF DOLLARS



	New Orders* 1956	New Orders* 1955	Sales* 1956	Sales* 1955
Jan.	14,683	12,142	13,595	11,850
Feb.	14,107	12,170	13,593	12,029
Mar.	13,337	13,353	13,294	12,860
Apr.	14,073	12,879	13,519	12,805
May	14,732	14,331	13,754	13,322
June	14,185	14,033	13,850	13,527
July	13,513	13,571	12,627	13,503
Aug.	15,166	15,145	13,665	13,745
Sept.	14,377	14,936	13,730	13,692
Oct.	14,500†	14,094	14,200†	13,261
Nov.	.....	14,680	.....	13,721
Dec.	.....	15,695	.....	13,688

*Seasonally adjusted. †Preliminary U.S. Office of Business Economics

Charts copyright, 1956, STEEL.

will continue its "backbone" role in the over-all picture. Not much added strength can be expected from this quarter, even though the American Iron & Steel Institute estimates a tonnage record (2,511,000 tons for ingots and castings) for the industry during the week ended Dec. 16. This is only 48,000 tons above the lowest weekly figure posted since full recovery from the steel strike, and that doesn't make more than a wiggle in the trend line.

When it comes right down to it, freight car loadings can open or slam shut the door to any more records for the index this year. They passed their peak about a month ago. The ore season is over for the most part. The week ended Dec. 15 will be the last period to show any significant rail movement of Upper Lakes ore. After that, advances in the other three segments of the index will have to be stronger than now appears likely to keep the trend line going up.

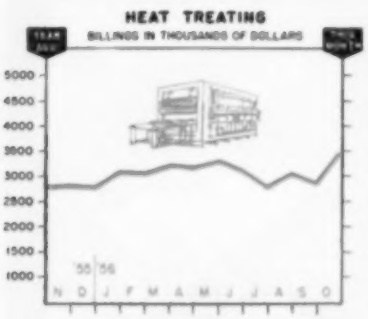
Curtice Looks at 1957

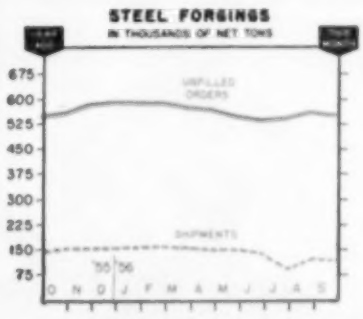
While attending the National Automobile Show in New York, several of motordom's top executives voiced their thinking on prospects for 1957. Most talk centered on auto production, which was generally forecast at about 6.5 million units for next year. But Harlow H. Curtice, president of GM, went even farther. He predicted the gross national product could go as high as $435 billion in 1957. After making allowances for some price rises, he said the rate of increase will be less than that experienced in 1956 over 1955. Employment will be substantially full, and consumer disposable income will continue to rise, possibly reaching a total of $300 billion for the year. It will be about $287 billion in 1956, he forecast.

Defense spending will be in the neighborhood of $42 billion, and other federal, state and local expenditures will increase somewhat. Construction will continue its uptrend—mostly in nonresidential structures, and highway building should rise to about $8.5 billion.

Sales, Profits To Be High

An equally bullish report comes from the National Association of Credit Men, which says a majority of 100 top executives from 25 different lines of industry expect their sales during 1957 to increase





	1956	1955	Per Cent Gain Or Loss*
January	3,082.8	2,181.0	+41.4
February	3,045.2	2,184.5	+39.4
March	3,226.2	2,599.5	+24.1
April	3,172.0	2,579.5	+23.0
May	3,292.3	2,644.4	+24.5
June	3,094.5	2,645.1	+17.0
July	2,762.5	2,180.0	+26.7
August	3,040.7	2,439.3	+19.9
September	2,832.9	2,581.0	+ 4.2
October	3,442.3	2,897.2	+18.8
November	.....	2,809.1	.....
December	.....	2,786.6	.....
Total	.....	29,601.2	.....

*Compared with year-ago month. Metal Treating Institute.

	Shipments 1956	Shipments 1955	Unfilled Orders 1956	Unfilled Orders 1955
Jan.	160	136	589	453
Feb.	152	135	589	460
Mar.	159	154	578	479
Apr.	150	150	569	475
May	151	147	551	488
June	143	155	540	501
July	98	115	547	513
Aug.	123	135	562	547
Sept.	121	149	554	552
Oct.	...	158	...	560
Nov.	...	158	...	585
Dec.	...	158	...	592

U.S. Bureau of the Census. Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more.

over those of 1956, while profits will be at least as high as they are this year. The association's annual survey predicts:

1. Dividends will continue at the 1956 rate.

2. Approximately the same amount of outside financing will be required.

3. Wages will be higher.

4. Plant and equipment expenditures will be at the 1956 level.

5. Outlay for research on new products or labor-saving devices will be up.

Structural Steel Going Up

Structural steel fabricators are rounding out the best year in their history (see chart, page 72), and they anticipate an even better one in 1957. N. P. Hayes, president of the American Institute of Steel Construction, expects new orders to reach 4,050,000 tons next year, compared with 3.9 million tons in 1956. Highway and bridge construction will supply the main spark. Shipments will exceed 3.8 million tons, an increase of 14 per cent over this year's. Backlog of orders, now pegged at more than 3.2 million tons, will continue to rise but not at the rapid pace evidenced this year. Trade sources report that the backlog of heavy construction work now in the active planning stage is worth over $100 million.

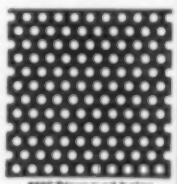
Construction Outlook Good

Construction put in place set a record for November, amounting to $3.8 billion, report the Commerce and Labor departments. At $44.6 billion (seasonally adjusted), this was the highest annual rate for any month since July. Awards for future construction also set a November record of $1,735.7 million, says *Engineering News-Record*, indicating the size of things to come.

Tight money is not expected to slow down major industrial construction too much in 1957, according to Fred C. Foy, president of Koppers Co. Inc., Pittsburgh. "In fact," he says, "We have had some rather substantial orders in the last 90 days." William Collins, president of Walter Kidde Constructors Inc., believes that expansion, modernization, mergers and research programs are sufficient to maintain industrial construction at or slightly above present rates despite tight money.

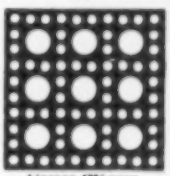
Perforated Materials for *Every* Application

Contact H & K for any perforated materials your product may require.



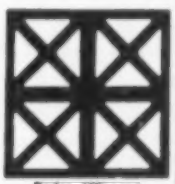
.060" Staggered holes. 186 holes per sq. in. 3/32" centers. 36% open.

We will be glad to work with you on your perforating problems.



Lincana 47% open

Perforating all metals, Masonite, plywood, paper, cloth and plastic.



Parfax 48% open

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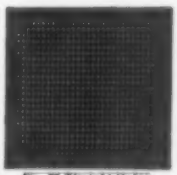
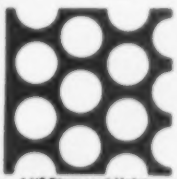


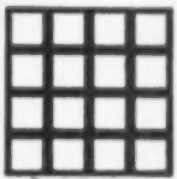
No. 90 Straight Slots 950 holes per sq. in. .060" diam. 36% open.

We have tools for perforating thousands of different patterns.



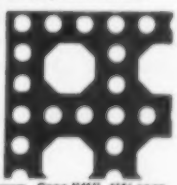
1/4" Staggered Holes. 5/16" centers. .50" diam. 68% open.

See our catalog in Sweet's Product Design File.



Two-tenths square, 64% open.

Round holes, square holes, slots, ornamental patterns, oblong holes, oval holes.



Cana "41" 41% open.

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- ☐ STOCK LIST of Perforated Steel Sheets
- ☐ SAMPLES of Perforated Plastics and Paper
- ☐ PRICE INFORMATION (NOTE: Send specifications of perforated materials wanted. If necessary send drawings or sketches.)

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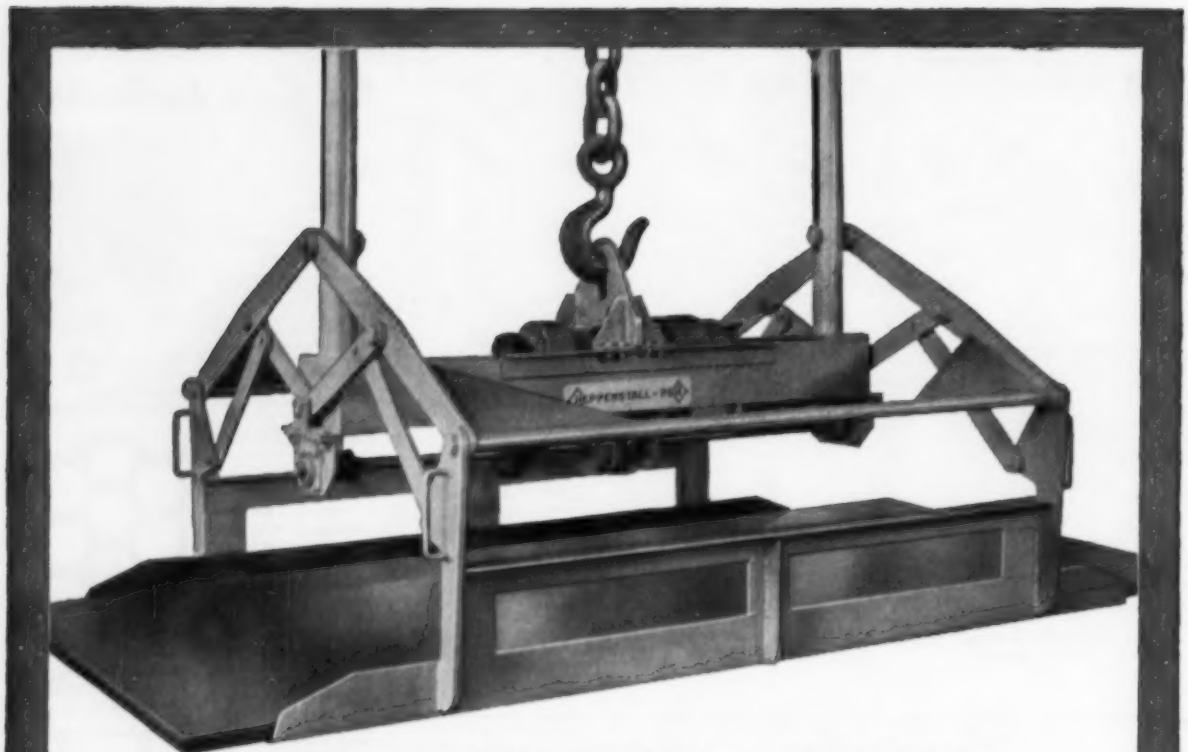

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MAKE IT SAFER...REDUCE COSTS
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This latest addition to the Heppenstall line of tongs has remarkable safety and ease-of-operation features that will save you both time and expense. Its design and construction solve many problems in sheet handling, and offer you these important advantages:

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2. **Decreases sheet damage because of straight line motion of lifting arms.**
3. **Cannot lose load because of self-locking brake.**
4. **Available in hand or motor operated models.**
5. **Unlimited capacities.**
6. **End Grabs for use with very wide or very long sheets can be added as optional equipment.**
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STRAIGHT LINE MOTION OF GRABS. There is no up and down arc . . . vertical members remain vertical and the lifting angle moves in and out parallel to the floor. This action greatly reduces the possibility of damage to the sheets.

MANUALLY OPERATED SHEET LIFTER: Available with either chain or wheel operation.

TONGS FOR EVERY LIFTING PROBLEM

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NEW BRIGHTON, PA.

EDWARD H. PERKINS JR.
. . . Brooks & Perkins vice president

Edward H. Perkins Jr. was elected vice president, **Brooks & Perkins Inc.**, Detroit. He is manager of the Magplate Division and administrative assistant to the executive vice president.

Michigan Chemical Corp., St. Louis, Mich., appointed **Everett E. Klicker** sales manager, rare earths and thorium division. He was supervisor of market development in the technical division of Pennsylvania Salt Mfg. Co.

Everett A. Sisson was made director of sales, **Patterson Foundry & Machine Co.**, East Liverpool, O., a subsidiary of Ferro Corp. He was sales manager at Osborn Mfg. Co.

Russell, Burdsall & Ward Bolt & Nut Co. appointed **Willard Dunham** and **Henry Steers** assistant western sales managers, located in the Chicago office. Mr. Dunham was manager, western distributor sales. Mr. Steers is replaced by **David Spoehr** as salesman in the St. Louis territory.

Ralph R. Herniman was made manager of the Buffalo branch office of **Kaiser Aluminum & Chemical Sales Inc.** He was chief project engineer for Fedders-Quigan Corp.

Lee Witte was named shop superintendent of **McCulloch Motors Corp.**, Los Angeles.

STUART H. SMITH
. . . SKF vice president-sales

Stuart H. Smith was elected vice president-sales, **SKF Industries Inc.**, Philadelphia. He was general sales manager.

Harold E. Engelbaugh was made general manager of steel operations at **Youngstown Sheet & Tube Co.**, Youngstown, succeeding **William H. Yeckley**, recently made vice president-operations. **John S. Stanier**, general superintendent of flat rolled and tubular mills at the Campbell plant, succeeds Mr. Engelbaugh as manager of Youngstown district operations.

S. E. Havens was made Pacific coast district manager for American Chain & Cable Co. Inc.'s **Wright Hoist Division.** He is located in San Francisco.

William E. Prather was appointed vice president in charge of production facilities in the U.S. and Canadian plants of **Lau Blower Co.**, Dayton, O.

Clayton DuBosque Jr. was appointed assistant to the executive vice president of **American Machine & Foundry Co.**, New York. He was engineering assistant to the general products group executive.

C. W. Blount was made vice president-marketing and **J. D. Benedito**, vice president-sales, at **Bakelite Co.**, division of Union Carbide & Carbon Corp., New York.

PAUL N. STANTON
. . . Lapointe Machine Tool sales mgr.

Paul N. Stanton, assistant sales manager, **Lapointe Machine Tool Co.**, Hudson, Mass., was named sales manager. He will report to Joseph P. Crosby, vice president-sales.

William J. Keegan was elected president, **General Water Heater Corp.**, Burbank, Calif., a subsidiary of Siegler Corp. He succeeds **John G. Brooks**, Siegler president, who has served as interim president of General Water Heater since its acquisition in July, 1956.

LaSalle Steel Co. appointed **Kenneth Bock** sales manager in southern California and the Pacific Northwest, with headquarters in Los Angeles. **William G. McKinley** was made sales representative in the Pacific Northwest. **Fred E. Wissing**, who formerly covered the entire western area, continues as representative in the San Francisco-northern California area.

U. T. Kuechle, automotive general sales manager, **A. O. Smith Corp.**, Milwaukee, was elected a vice president.

William F. Tamplin was made assistant manager of sheet and strip sales for **United States Steel Corp.**, Pittsburgh. He was assistant to the manager, sheet and strip sales.

R. L. Broderick was made Houston district manager for the **Autronic**

S. D. HACKLEY
. . . Kaiser Industries v. p.

Process Controls Division of Swartwout Co. He was project engineer in the division's Cleveland plant.

S. D. Hackley was elected a vice president, **Kaiser Industries Corp.** He is at the New York offices. Mr. Hackley also is vice president-general manager of Kaiser Metal Products Inc. at Bristol, Pa., and has been a vice president of Henry J. Kaiser Co. since 1954.

Robert L. Knox and **Herman R. Brown** were made assistant sales managers, **Frank G. Hough Co.**, Libertyville, Ill. Mr. Knox is in charge of distributor sales; Mr. Brown, manufacturers sales.

Don O. Noel was made assistant to the president, **Metals Disintegrating Co. Inc.**, Elizabeth, N. J. **Terry M. Kuwashima** joined the firm as a development engineer.

Allan T. Russell, former purchasing agent for Letz Mfg. Co., was made a special representative in the sales department of **Bliss & Laughlin Inc.** He has headquarters in Harvey, Ill.

Thomas P. Turnbull was appointed service manager, instruments division, **North American Philips Co. Inc.**, Mt. Vernon, N. Y.

C. E. Rogers was made metallurgist, alloy rod and metal division, **Victor Equipment Co.**, Norwalk, Calif. He was chief metallurgist for Stoody Co.

JAMES H. BRAY
. . . mgr.-roll dept. at Birdsboro

James H. Bray was named manager, roll department, **Birdsboro Steel Foundry & Machine Co.**, Birdsboro, Pa. He is succeeded by **William L. Van Winkle** as roll sales representative in the Pittsburgh area.

R. B. Strawn was made director of research, **Diebold Inc.**, Canton, O. He succeeds **John P. Paca**, retired.

Richard F. Sentner, presently assistant executive vice president-commercial, **United States Steel Corp.**, Pittsburgh, was named to succeed **David F. Austin** as executive vice president-commercial. Mr. Austin will retire Dec. 31 after nearly 39 years of service.

ROD T. DAVIES
. . . fills Wolverine aluminum post

Rod T. Davies was promoted to the new post of manager of aluminum sales, **Wolverine Tube Division**, Calumet & Hecla Inc. Formerly aluminum sales representative, he now co-ordinates sales for aluminum tubes and extruded shapes, with headquarters in Detroit. **Robert C. Crowe** was made manager of industrial sales for Wolverine Tube to succeed **E. W. Ervasti**, recently made general sales manager of Calumet & Hecla of Canada Ltd. **C. A. Johnson** replaces Mr. Crowe as sales representative in the Detroit area.

Paul A. Mori was named executive vice president, **Cleveland Quarries**

RICHARD F. SENTNER

DAVID F. AUSTIN

. . . executive change at U.S. Steel Corp.

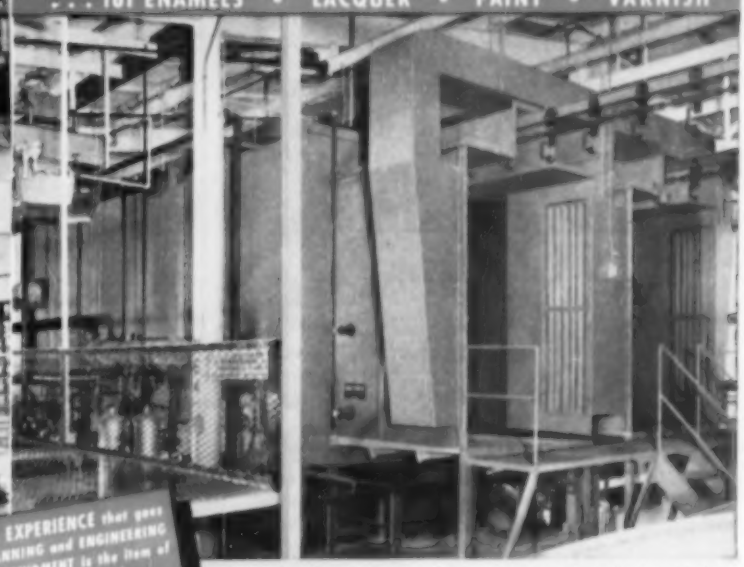
COMPLETE *Finishing* SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH

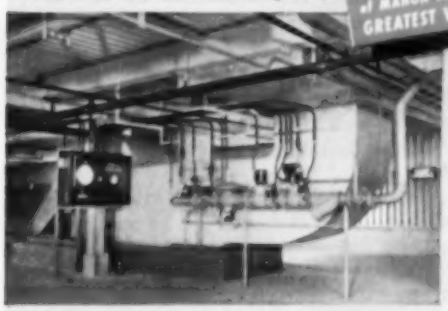
Combined Paint and Solvent Reservoirs, Recirculating Pumps and Temperature and Viscosity Controls on one side of Flow Coater.

View of Ventilated Drip Enclosure and inclined Tunnel to the Overhead Finish Baking Oven.

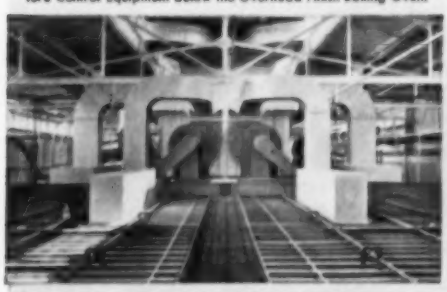
. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!



Mahon Dual Flow-Coating Machine with two separate and independently controlled Flow-Coating Units serving two parallel conveyor lines.



One of the Gas-Fired Heating Units with Automatic Temperature Control Equipment below the Overhead Finish Baking Oven.



General view of Mahon Air Supply and Exhaust Equipment which provide Filtered Air and Ventilation for the entire system.

Dual Flow-Coating System CUTS Paint VOLUME, MANPOWER Requirements, and Operating COSTS!

The new Flow-Coating System illustrated here has proved a tremendous saving in painting automobile hoods, fenders, fans and miscellaneous parts. The system has two parallel conveyor lines carrying parts through a dual Flow-Coating Machine—either side of which may be operated independently. Each section of the Flow-Coating Machine is served by a 450-gallon paint reservoir and a 450-gallon solvent reservoir and are fitted with automatic equipment to maintain constant paint viscosity and temperature. Other equipment in this system includes ventilated drip enclosures with sumps, scavenger pumps, and facilities for solvent flush-down, a finish baking oven and an air supply and exhaust system. This system now paints, on one line, all parts previously painted in two dip-coating systems which required an operating volume of 16,000 gallons of paint. One man operates and maintains the new Mahon System, where twelve men were required to operate and maintain the old equipment. The savings in material, labor and operating costs are obvious. If you have a finishing problem, it will pay you to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you will find them better qualified to advise you, and better qualified to do the all-important planning, engineering and coordinating of equipment . . . and, if you care to investigate, you will also find that Mahon equipment will serve you better over a longer period of time. See Sweet's Plant Engineering File for information, or write for Catalog A-657.

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Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems, Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

JAMES W. HUTCHISON
. . . Olin Revere v. p.-reduction

EARL B. SMITH
. . . Osborn Mfg. sales manager

ROBERT B. KRAMER
. . . plant mgr. at Page Steel & Wire

Co., Amherst, O. He was vice president.

James W. Hutchison was elected vice president in charge of reduction at **Olin Revere Metals Corp.**, Omal, O. He was manager of Reynolds Metals Co.'s Jones Mill reduction plant, Malvern, Ark.

William Alvarez was made manager of engineering for **General Electric Co.'s** industry control department, Roanoke, Va. He was acting manager.

William M. Cameron III was made director of design for **Planar Associates**, Pasadena, Calif. He was production supervisor for Henry Keck Associates.

Earl B. Smith was made sales manager of the machine division of **Osborn Mfg. Co.**, Cleveland. **Edmond K. Hatch** was made assistant manager; **E. Henry Brauer**, assistant chief engineer.

Theodore L. Walker was named works manager, **Security Engineering Division**, Dresser Industries, Dallas. He was general plant manager for Clark Equipment Co. at Jackson, Mich.

Leo E. Gatzek was made supervisor of the heat treating and plating and welding departments, Pacific Division, **Bendix Aviation Corp.**, North Hollywood, Calif. He continues as head of the Bendix-Pacific metallurgical laboratory.

Robert B. Kramer was made plant manager, **Page Steel & Wire Division**, American Chain & Cable Co. Inc., Monessen, Pa. Formerly wire mill superintendent, he became assistant plant manager early this year.

Donald H. Tilson was named manager of Pacific Northwest operations for **Aluminum Co. of America.** Succeeding **C. S. Thayer**, retired, he assumes responsibility for smelting and fabricating operations at Vancouver and at Wenatchee, Wash. He was made assistant manager last April.

George E. Brenton was named district manager of the new Houston office of **Vilter Mfg. Co.**

OBITUARIES . . .

Edward L. Parker, chairman, **Columbia Steel & Shafting Co.**, Carnegie, Pa., died Dec. 4.

John P. Fitzpatrick, 62, general manager and sales executive of **Marquette Bolt & Rivet Co.**, Chicago, died Dec. 2.

Samuel Auld, 59, general superintendent, **Leach Steel Corp.**, Rochester, N. Y., died Nov. 25.

Samuel Danits, 58, owner of **Samuel Danits & Co.**, Chicago, died Dec. 1.

Ernest Szekely, 68, retired president and general manager, **Bayley Blower Co.**, Milwaukee, died Nov. 29.

Henry O. Steinhorst, president and general manager, **Emil Steinhorst & Sons Inc.**, Utica, N. Y., died Nov. 26.

Fred W. Swanson Sr., 71, chairman, **Globe Machinery & Supply Co.**, Des Moines, Iowa, died Nov. 28.

Augustus T. Hatch, 81, president and general manager, **Davenport Machine Tool Co.**, Rochester, N. Y., died Nov. 28.

Herbert W. Beutel, vice president, **Mosher Steel Co.**, Dallas, died Nov. 2.

J. J. Hanney, 58, sales representative in Grand Rapids, Mich., for **Metal & Thermit Corp.**, died Nov. 24.

William P. Woodside, 79, founder of **American Society for Metals** and a former auto industry executive, died Dec. 5.

Victor Mauck, 82, retired chairman, **John Wood Co.**, Conshohocken, Pa., died Dec. 2.

William F. Brannan, 63, president, **Anchor Post Products Inc.**, Baltimore, died Dec. 1.

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Here's the story of fatigue-proof steel bars

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Elevated Temperature Drawing

*a **new** material—made by*

*a **new** process—with*

*a **new** combination of properties*

High Strength
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Uniformity
Fatigue Resistance
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Dimensional Stability

Plus Accuracy, Smooth Finish, and Straightness

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Plans Expansion

Hughes Aircraft is erecting an engineering building and warehouse in Tucson, Ariz.

HUGHES Aircraft Co., Culver City, Calif., will expand its facilities in Tucson, Ariz. A $1.25-million engineering building and a $1.1-million warehouse will be completed within a year.

The engineering building will have 50,000 sq ft of space. It will be erected at the intersection of Nogales highway and the main entrance to the huge Hughes factory south of Tucson where the Falcon air-to-air guided missile is produced. It will house all research and designing activities connected with the Falcon, including the main engineering department now at Culver City.

The warehouse will contain 100,000 sq ft of space which will be used to store factory materials and spare equipment. It will be erected on a 19-acre site just northwest of the factory.

Reliance Opens New Outlet

Reliance Electric & Engineering Co., Cleveland, is opening a distribution center at North and Division streets, Elizabeth, N. J. The firm makes electric motors and variable-speed drives. K. R. Wright is supervisor of the new facility.

Dana Corp. Builds Warehouse

Dana Corp. plans to build a central office and warehouse for the company's Parts Division on Bennett road, Toledo, O. It will have 150,000 sq ft of floor area. The firm makes parts for the automotive and farm implement manufacturing industries.

DeVilbiss Enlarges Branch

DeVilbiss Co., Toledo, O., constructed a larger direct factory branch at E. Slauson and S. Garfield avenues in Los Angeles. It is five times bigger than its predecessor. The firm makes spray guns, booths, air compressors, rubber hose and other components for finishing systems. George Fulton is manager of the branch, working under the direction of J. W. Dayton, west coast district sales manager. D. L. Bohon is the west coast general manager.

Orders Oxygen Generating Unit

A generator to produce oxygen by the liquefaction of air will be built next year by Granite City Steel Co., Granite City, Ill. It will be able to produce 70 tons (48 million cu ft) of oxygen a month. The company already operates two smaller oxygen generators.

Trion Forms Canadian Unit

Trion Inc., Pittsburgh, manufacturer of electronic air cleaning equipment, established a subsidiary company, Trion (Canada) Ltd. Negotiations for facilities in Toronto, Ont., are in progress. Operations are expected to begin early in 1957.

U. S. Steel Homes Division

United States Steel Homes Inc. has been changed from a subsidiary company to an operating division of United States Steel Corp. H. D. Moulton, president of United States Steel Homes Division, says the organization will continue to maintain general offices in New Albany, Ind. Plants are operated in that city and in Harrisburg, Pa.

American Coils To Move

American Coils Co. will move its plant and executive offices from Newark, N. J., to Farmingdale, N. J. The firm makes year-round packaged air conditioners and several sizes of packaged water chillers and forced draft cooling towers. The new building, which is under construction, contains 63,000 sq ft of floor space.

Builds in Philadelphia

George K. Garrett Co. is building a $2.5-million plant at 8800 Torresdale Ave., Philadelphia, Pa. The firm makes spring lock and flat washers, hose clamps, metal stampings and assemblies. The plant will consolidate facilities of the company now housed in two northeast Philadelphia plants.

J&L Opens Tulsa Facility

Jones & Laughlin Supply Division formally dedicated its $1.7-million headquarters building and supply store at 15th and Sheridan road, Tulsa, Okla. Adm. Ben Moreell, chairman of Jones & Laughlin Steel Corp., the parent organization, officially opened the building by cutting a strand of J&L wire rope.

Enters Specialty Casting Field

American Brake Shoe Co., New York, is entering the specialty aluminum casting business. Production in a pilot foundry has been under way for about one year and an aluminum foundry is under construction at Mahwah, N. J.

Alpha Metals Opens Branch

Alpha Metals Inc., Jersey City, N. J., opened a sales and manufacturing branch at 2250 S. Lumber St., Chicago, Ill. It will be known as Alpha-Loy Corp. Harold Cohn is in charge of the new organization. Alpha Metals makes solder, solder preforms, flux, tin, lead and their alloys.

Foote Mineral Buys Plant

Foote Mineral Co., Philadelphia, purchased ceramic grinding facilities at Cold River, N. H. The mill was the property of J. F. Morton Inc., a feldspar producer. Foote is modernizing the plant and will start producing ceramic products soon. The company also has leased feldspar mining properties in the Cold River locality and plans to market feldspar products next year. George B. Kneass Jr. is plant manager.

Parker Stamp Works Renamed

Parker Stamp Works Inc., Hartford, Conn., changed its name to Parker-Hartford Corp. The firm makes metal marking tools, dies and machinery which are used on production lines for indenting and embossing operations. The firm also makes molds and dies for the plastic and die-casting industries, two and three-dimensional cams for controls, memory devices and other instruments, plus vanes and

blades for jet aircraft engines and turbines.

Thor Power Tool Opens Branch

Thor Power Tool Co., Aurora, Ill., opened a branch office at 1489 N. Harding St., Indianapolis. It is under the direction of R. E. James Jr. The firm makes portable air and electric power tools.

Cleveland Brass To Buy Plant

Cleveland Brass Mfg. Co., Cleveland, is negotiating to buy a 40,000 sq-ft plant at Kinsman, O., which is owned by Glauber Brass Co. Cleveland Brass wants it for the manufacture of rough plumbing equipment and similar products.

ASSOCIATIONS

CLIFFORD J. SHEEHAN
. . . Amer. Die Casting president

American Die Casting Institute Inc., New York, elected Clifford J. Sheehan president. He is eastern sales manager, Die Casting Division, Aluminum Co. of America, Garwood, N. J. His predecessor, W. J. During, resigned. Mr. Sheehan plans to concentrate on the public relations activities to promote full understanding of the role of the job-shop diecaster in American industry.

Harry F. Vickers, president of Sperry Rand Corp., New York, and founder of Vickers Inc., Detroit, received the ASME Medal for 1956 at the annual meeting of the **American Society of Mechanical Engineers.**

Radio - Electronics - Television Manufacturers Association will consolidate and move its Washington headquarters. It will occupy quarters at 1721 De Sales St. N.W., Washington, D. C., about Feb. 1.

CONSOLIDATIONS

Anthony Co., Streator, Ill., purchased **Truck Crane Inc.**, Chicago, maker of hydraulic truck cranes. Plans call for the transfer of all manufacturing, sales and service functions to the main plant at Streator.

Hoover Ball & Bearing Co., Ann Arbor, Mich., purchased **Gerity-Michigan Corp.**, Adrian, Mich. A year ago, the Hoover concern purchased Universal Die Casting & Mfg. Corp.

Beckman Instruments Inc., Fullerton, Calif., acquired **Watts Mfg. Co. Inc.**, Ronceverte, W. Va., manufacturer of a continuous-action gas chromatograph, temperature test stands for jet engine development and automatic flow detectors for the textile industry.

Eagle - Picher Co., Cincinnati, purchased **Chicago Vitreous Corp.** and **Lusterlite Corp.**, an affiliated company, Cicero, Ill. Chicago Vitreous produces porcelain enameling frits and will operate as a division of Eagle-Picher Co. under its present management.

Consolidated Electrodynamics Corp., Pasadena, Calif., acquired the major assets of **R. A. Castell & Co.**, Glendale, Calif., manufacturer of electronic components. R. A. Castell will be general manager of the new division.

Hooker Electrochemical Co. and **Oldbury Electrochemical Co.**, Niagara Falls, N. Y., have merged. Oldbury will be operated as a division of Hooker. Oldbury produces phosphorus, phosphorus compounds, chlorates, perchlorates, oxalic acid and perchloric acid. Hooker makes chlorine, caustic soda, caustic potash, phenol, hydrogen, phenolic and polyester resins and plastic molding compounds.

Flex-O-Tube Division of Meridan Corp., Inkster, Mich., will merge with **Flexonics Inc.**, Maywood, Ill., effective Jan. 1. Flex-O-Tube makes flexible hose and cable for machine connections.

Air Products Inc., Allentown, Pa., acquired **Steele Gases Inc.**, Chicago, maker of oxygen, nitrogen, acetylene and other gases. C. W. Steele will continue as president of Air Products' new subsidiary. He also will be responsible for the operations of Midwest Air Products Inc., which makes cylinder gas in the South Bend, Ind., and Chicago areas.

REPRESENTATIVES

Timken Roller Bearing Co., Canton, O., appointed Vanadium-Alloys Steel Canada Ltd., London, Ont., as a distributor of its tool steels and hollow bars, with exclusive sales rights in Canada. The Canadian firm, a subsidiary of Vanadium-Alloys Steel Co., Latrobe, Pa., has rolling mills, a forge shop and complete finishing equipment for the production of tool steel, stainless steel, special alloy steel bars and forgings.

NEW ADDRESSES

Chesapeake Industries Inc., established its executive and general offices at 485 Lexington Ave., New York 17, N. Y.

F. W. Marshall & Co. (pig iron) moved to 220 S. 16th St., Philadelphia, Pa.

Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., moved its automotive industry sales office to larger quarters at 2214 Fisher Bldg., Detroit, Mich. M. C. Crockett is office manager. R. C. Bichan has been appointed assistant to Mr. Crockett. C. G. Sterling has been appointed an automotive development engineer.

GLAD I CALLED IN "ELL" AND "ESS"!

No, this isn't a junk man's dream.
These are just the parts for a new product—*without* bolts and nuts!
And it's about time our friend called in "ELL" & "ESS"
for expert advice on "how to fasten it".
Selection of the *right* fastener for the job at hand is important in many
ways: assembly efficiency on the production line, ability to do the
holding job at minimum cost and smooth operation of the finished product.
Consumer products must also have "sales appeal" appearance.
So don't guess—Call in "Ell" & "Ess". There's no
charge and they may save you a pretty penny!

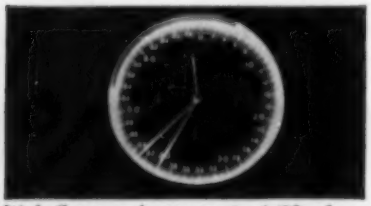
The LAMSON & SESSIONS Co.

1971 West 85th Street · Cleveland 2, Ohio
PLANTS AT CLEVELAND AND KENT, OHIO · BIRMINGHAM · CHICAGO

Time exposure shows continuous motion of red-hot ingot as it travels through roller.

"Never replaced screwdown or nut using Cities Service E. P. Lubricants!"

Circulating System located on floor below mill, uses Cities Service E. P. Oils. Mill operates 160 hours a week, has never had lubrication failure.



Dial Gauges Accuracy to 1/32 of an inch. It is used by operators in the pulpit, who control the mill's 7000 horsepower and shape its steel to unusually fine tolerances for a blooming operation.

Ever since the installation of this blooming-slabbing mill at Pittsburgh Steel Company's Monessen Works, Cities Service E. P. Oils have been used for lubrication.

During that time, over 4,000,000 tons of steel have been run through the mill's huge rolls . . . but never once has the firm found it necessary to replace the screwdown, nut or any bearing due to lubrication failure.

A Pittsburgh Lubrication Engineer says: "Oils stay with the parts that must be lubricated and never give us a problem."

Where an inferior lubricant might be wiped away during the regular operation of the mill, Cities Service E. P. Oil withstands continuous operation. In addition, the oil can be centrifuged and yet not lose its additive.

Pittsburgh Steel is one of an increasing number of steel manufacturers who report outstanding results with Cities Service Lubricants. A Cities Service Lubrication Engineer will be happy to supply all the reasons. Or, if you prefer, write Cities Service Oil Company, Sixty Wall Tower, New York 5, New York.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Technical Outlook

NO RIVETS—For some time, aircraft builders have been looking at adhesives as a substitute for rivets in frame construction. B. F. Goodrich now announces the breakthrough: The newest Air Force bomber, the supersonic B58, is the first military aircraft to use a bonding film (cement) instead of rivets in the fuselage, wings and tail assembly. The adhesive, described as "revolutionary and of amazing strength," was developed by the Ft. Worth (Tex.) Convair division of General Dynamics Corp. and B. F. Goodrich Industrial Products Co., Akron.

NITRIDED TOOLS—Tempco Aircraft Corp., Dallas, says it's getting 200 to 400 per cent longer life from end mills and other high speed steel tools by salt bath nitriding them. Treatment is for 1 hour at 1050°F in an internally heated electrode salt bath. It was installed by Ajax Electric Co., Philadelphia.

FIRE RETARDANT PAINTS—Paints with zinc borate pigments and vehicles made of alkyd combinations had the best fire retardant characteristics of 30 commercial formulations tested in 1952 by Army Engineers. Classified until now, the report has been released by the Office of Technical Services, U. S. Department of Commerce.

CLAD EXTRUSIONS—Impact extrusions are being made from Al-clad aluminum, reports Alcoa. The thin surface cladding provides protection against corrosion, makes finishing and joining easier. Aluminum impacts now will be used in such devices as water filters, small water tanks, steam traps, electrical cases and fittings for hot water heaters. Other possibilities: High strength parts can be clad with an aluminum alloy suitable for all types of finishing. A thin layer of brazing alloy, inside or outside the extrusion, opens up new ways for the assembly of appliance, electronic and aircraft parts.

MoS_2 PLUS NYLON—Parts for aircraft fuel pumps are said to last longer and resist chemical deterioration better when they are made from a new nylon powder which contains the high temperature lubricant, molybdenum disulphide. Example: Miniature pumps that handle fuel at temperatures of −65 to 110°F and a pressure of 200 psi. The formula is called Nylatron (National Polymer Products Inc., Reading, Pa.), and can be used in pumps which handle pressures up to 1300 psi.

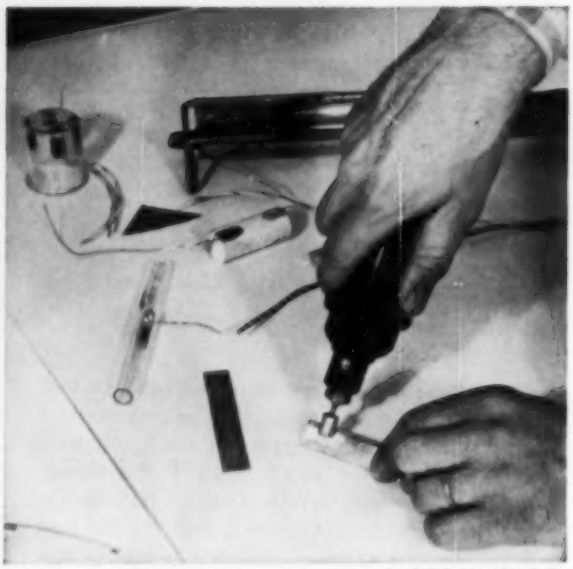
ULTRATHIN COPPER—Pilot plant quantities in thicknesses as low as 0.00015 in. are being made in tape form, reports American Silver Co., Flushing, N. Y. It was developed for the Air Force's wafer-type coils where it replaces bulkier, heavier wire. It should find application in other products where space and weight are important, such as transformers, solenoids, relays, coils, signoid transformers, pulse transformers and traveling wave tube solenoids.

WARM WELD—There's a new way to weld high strength aluminum alloys like 7075-T6: Parts are heated to a precise temperature in the 300 to 500°F range and butted under a controlled pressure and time cycle. The patent holder, Lloyd A. Cook, Ravens-Metal Products, Ravenswood, W. Va., says the weld is 90 to 100 per cent efficient; in some cases, you can't detect any difference between the weld and parent metal. Look for it to overcome several joining problems that have plagued major aircraft builders.

Metalworking Outlook—p. 47 *Market Outlook—p. 119*

Lead Industries Association

The Los Alamos scientific laboratory developed this method for soldering. Here is the first step: Loading the grinding wheel with solder



Lead Industries Association

Here an operator is tinning a piece of stainless steel. Other items—glass, ceramics, Pyrex—are shown soldered to copper wires

Soldering Keeps Up to Date

HEAT, flux and a little solder make strong, tight metal joints.

It's an age-old technique, but it's keeping up with ultrasonics, automation, induction heating and modern chemicals in this atomic age. The tin-lead mixture is no longer simple. Small additions of germanium, nickel, strontium, indium and other rare earths greatly extend its usefulness.

This article describes some modern applications, tells how to solder aluminum, magnesium, titanium or stainless steel and gives a few tips on fluxes and techniques.

Preforms—The Pyrene Mfg. Co., Newark, N. J., wanted to cut the time required to solder four points on fire extinguishers. Working with Alpha Metals Inc., Jersey City, N. J., its engineers developed fluxes and preformed rings of solder which could be used with automatic equipment.

With it, 15 unskilled operators do as much in 4 hours as 23 skilled workmen did in 8. Less solder was used, and quality was improved.

Automation of soldering plays an important role in automotive manufacturing. Oldsmobile uses an induction heater on its gasoline tank and claims it gives better performance and quality than hand methods.

Stainless Steel

A tough film of surface oxide, low thermal conductivity and the danger of embrittlement due to excessive heat are factors that tax the skill of the operator trying to solder stainless.

When it must be soldered to copper, brass or bronze, the problem becomes more acute. The best solution, says Herbert Drapkin, chief engineer of Anchor Metal Co. Inc., Brooklyn, N. Y., is to select special solders and fluxes which will cope with the individual characteristics of dissimilar metals.

Coffee Urn — These vessels are frequently made of stainless. Solder has to have high tensile strength and produce a permanent, leakproof joint that withstands boiling water and steam.

Victory Coffee Urn Mfg. Co., New York, makes its product from 18, 20 and 24 gage chrome alloy steels. An all-purpose solder (Anchor #304) is used in the joining operation.

Here's how an urn is made and soldered.

1. The body is cut to size. Seams are double folded and locked, then soldered from the inside.

2. A copper bottom is soldered into a flanged circular groove in the body.

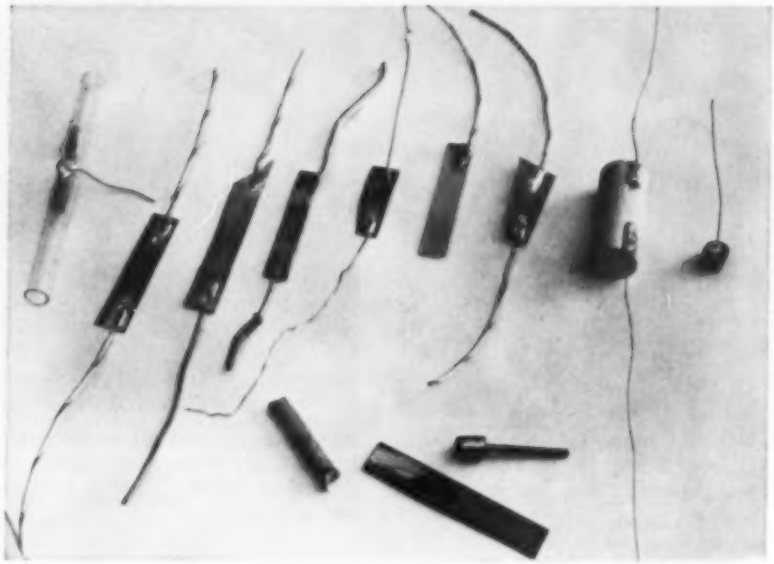
3. Brass locknuts for faucets and terminals are soldered to the body.

4. Center body connections of brass and bronze are made.

5. Copper heating coils are formed and soldered to brass locknuts which are soldered to bottom fittings.

6. The stainless filler cup is soldered to the body.

Differences—Low heat must be used to solder stainless to prevent



Lead Industries Association

Los Alamos method handled these: Pyrex, titanium, molybdenum, aluminum, tantalum, stainless, tungsten, ceramic and cobalt

Here is a look at what industry is doing with it and how it's being adapted to the needs of the atomic age. Technique is being used to join metals, glass and ceramics

base metal embrittlement. The austenitic types used for coffee urn bodies have a low thermal conductivity; at temperatures above 800°F, there is danger of carbide precipitation and loss of corrosion resistance.

In contrast, copper and its alloys are highly conductive and are more easily soldered than other metals. The exception is brass. Tin and zinc are incompatible and conventional solders tend to become contaminated with zinc compounds, leaving a brittle joint.

Anchor #304 alloys with stainless and dissimilar metals below 800°F. It contains no lead or cadmium. When used for external stainless joints, the solder provides a corrosion-free color match to the base metal.

Flux—Unlike copper, brass and bronze, which require mild fluxes, stainless needs a strong flux to remove tightly adherent oxide films. A flux has been developed that is a satisfactory deoxidizing agent, yet does not corrode copper which is more easily affected by corrosives.

Except for the bottom of the urn on which a large copper bit was used, heat was applied to the joints by a torch which burned a mixture of natural gas and compressed air. It was adjusted to a reducing flame and kept in constant motion to prevent the stainless turning brown. If it is allowed to reach such temperatures, it becomes unsolderable.

Pretinning—In joining stainless to stainless, the capillary action of the solder makes the joint. Pretinning of the base metal is recommended: Where possible, stainless steels should be precoated with solder—it will facilitate the joining to copper, for example.

After the metal parts have been clamped together, flux is brushed on the joint. The torch flame is directed to the underside of the joint, and the solder wire is touched to the exterior surface until it melts and flows freely around and through the joint.

Fillets — Joining copper alloy fittings requires rounded corners with broad fillets which are smoothed down to the body walls.

Thick layers of solder are weaker than thin ones. For best results, soldering should be done quickly and at minimum heat. The best joint clearance is 0.005 in. Thicker joints are less desirable. Those thinner than 0.003 in. often are weakened by poor solder penetration and possible flux inclusions.

From Aluminum to Titanium

Difficult metals can be soldered ultrasonically without flux. Any of the common solders may be used.

Ultrasonically induced cavitation in molten solder completely erodes oxide films and other contaminants to permit wetting. The method was described by John G. Thomas of Aeroprojects Inc., West Chester, Pa., at the annual soldering symposium of the American Society for Testing Materials.

No Stripping—In one application an ultrasonic unit removes polyvinyl acetate insulation from a wire and solders it to a terminal. No stripping or fluxing is necessary.

The setup is simple. Solder is held in a small can and kept molten by a heated platen. With the soldering head immersed in the molten metal, all the operator has to do is dip the part.

Corrosion — Ultrasonically soldered aluminum has a reasonable joint life in certain corrosive environments.

Solders high in zinc are usually preferred for marine atmospheres. Those which contain about 25 per cent zinc, 25 per cent tin, balance aluminum, look good in high humidity environments, if strength requirements aren't too high.

Uses—Ultrasonic equipment for the fluxless soldering and coating of metals is available for a broad range of applications.

Tiny devices are used to make soldered connections to silicon transistors. Intermediate sizes are used for manual and automatic soldering of electrical and electronic components which have been diecast, sand cast or formed. Larger units for the continuous fluxless coating of metal strip will

After the body of this stainless coffee urn is formed, it is soldered from the inside. Copper bottom fits into a flanged groove

Brass locknuts for faucets are soldered to body holes. A simple jig holds the assembly and locknut during joining

Next, brass locknuts for copper heating coils are soldered to fittings in the copper bottom. Heat is kept as low as possible

shortly emerge from pilot lines.

Special soldering tips solve production problems in many cases. Acoustically designed ultrasonic tips can be shaped to the contour of the part to facilitate soldering.

Aluminum—Compared with the soldering of most other metals, aluminum is different in three ways, explains J. D. Dowd of the Aluminum Co. of America. Its oxide is more tenacious and refractory. Solder does not flow into certain types of joints as well as it does with other metals. Corrosion resistance depends more on the composition of the solder.

Aluminum can be soldered by any of the common methods. Techniques more applicable to it than other metals include rub, ultrasonic and reaction-flux soldering. It is sometimes best to plate aluminum with copper, nickel or some other metal, then follow procedures for plated metals.

Solders usually are alloys of tin, zinc, cadmium and lead. Wetting, fillet size, joint strength and corrosion resistance generally increase with rising zinc content.

Paste—This is a proved method for cutting costs. "Where paste solder can be preplaced automatically," explains H. R. Williams, reseach director of Fusion Engineering, Cleveland, "costly labor is eliminated."

Here are some of his suggestions.

The basic objectives are: Simplification through automatic application and an automatic heating and soldering cycle.

Joints—In designing parts for a paste alloy, tight fits are required. Capillary flow of the filler metal is improved and joint strength is greater.

Automatic soldering requires a simple, firm method for holding parts together—a clamp, jig or mandrel that is positive, yet simple to remove.

In electrical resistance soldering, the clamp can act as a contact for the heating circuit. On high frequency induction heating, it must not shield the joint.

For large sheet metal areas, a few spot or tack welds along the surface, after the paste has been preplaced, will serve as a holding device and keep the thin surface from buckling.

Solder paste can be applied by dipping, rolling or brushing, auto transfer (silk screen), hand pressure applicators and mechanical pressure systems (automatic and semiautomatic).

Auto Problem—Soft solders are used in the assembly of auto radiators, which, until recently, operated at zero pressure. Today, they reach 16 psi. That means higher operating temperatures, so the radiator designer is confronted with a problem: Find a solder stronger than those in use, one that will retain its properties at elevated temperatures.

Research—Battelle Memorial Institute has been working on the problem. H. E. Pattee and R. M. Evans of Battelle say solders with high tin content show longer life.

Small additions of germanium, nickel, cerium and indium improve the ability of tin-lead solders to withstand high temperatures. The effect is more pronounced if the tin content is high.

Low concentrations of zinc, bismuth and antimony also improve high temperature properties. Higher concentrations are detrimental.

Researchers at General Electric Co., Schenectady, N. Y., point out that small quantities of a rare earth like indium increase the wettability of solder. That makes it stick tighter, increasing shear and tensile strength.

Titanium — Standard solders won't work on titanium because they fail to wet or adhere. Here is one way around the problem.

One firm wanted to hermetically seal an end cap to a titanium sphere. It was threaded in place then sealed with a 50-50 soft solder. Heat was applied with a tungsten arc operating in an argon shield. High frequency alternating current was used; the machine setting was 15 to 20 amperes.

Coating prior to soldering is another possibility. You overlay the joint with silver by using a tungsten electrode arc torch.

A few trials have been made

Copper steam coil is bent to shape and soldered to the brass flanges shown. Flux is applied before inserting pipe in the fitting

Final step is to solder the stainless filler cup to the body. A reducing flame is kept in motion to prevent overheating, which reduces resistance to corrosion

with a silver-depositing flux (silver chloride, or a mixture of 60 to 70 per cent silver chloride with 30 to 40 per cent copper chloride). Silver chloride is sprinkled on the titanium prior to heating with an oxyacetylene torch. The chloride melts and silver is deposited on the titanium by a displacement reaction. In both cases, the titanium is coated with silver which may be soldered with a 50-50 solder.

Specials

The University of California's Los Alamos scientific laboratory has developed a technique for soldering materials like aluminum, stainless steel, glass and ceramics without special equipment.

In addition to the usual soldering materials, you only need a hand grinder fitted with a wheel.

The tool is turned on and the abrasive wheel (preferably preheated by grinding metal or with a heater) is brought to bear on a soft solder like 40-60 tin-lead. The solder melts and flows into the surface of the wheel, "loading" it. The solder-loaded wheel is applied to the surface to be soldered until a slight amount of abrasion has taken place, using the same pressure required for grinding.

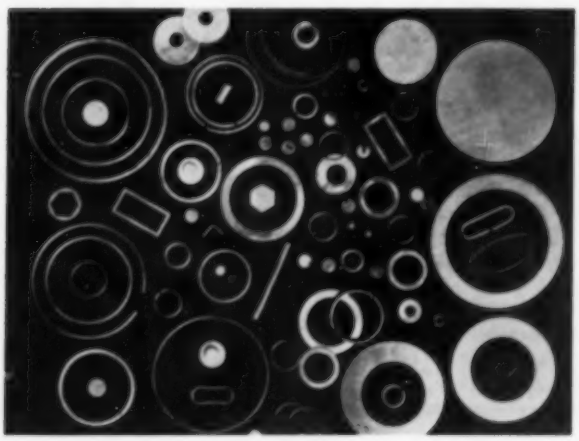
The heat of friction again melts the soft solder which flows onto the freshly abraded surface.

After the tinning, soldering is done in the usual manner with a standard 50-50 solder. The other surface is also given the same treatment if it is a material not ordinarily wetted by solder. No flux, cleaning or pretreatment are necessary.

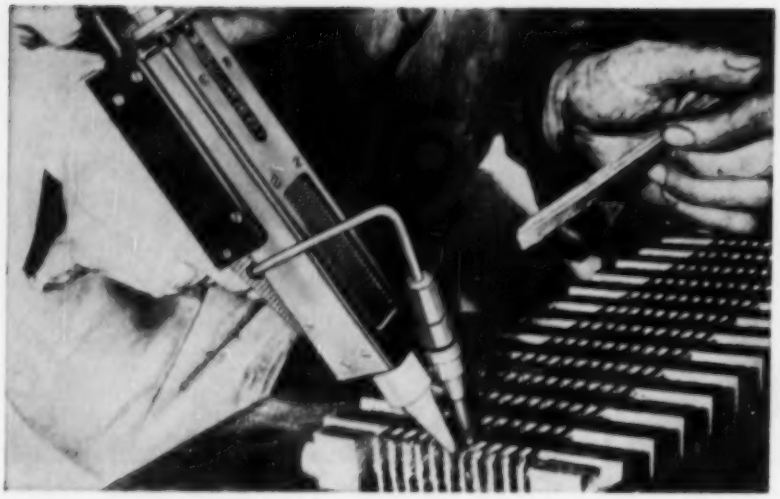
When working with materials like soft glass, Pyrex and ceramics, the best tinning is a mixture of Wood's metal and 50-50 indium-tin. If you solder glass to glass or ceramic to ceramic, it is necessary to use flame or a surface furnace.

Last Word—If you're going to store soldered articles at extremely low temperatures, be sure your solder contains gray tin inhibitors, says W. Lee Williams, Metallurgical Laboratory, U.S. Naval Engineering Station, Annapolis, Md. Joint deterioration from the formation of gray tin is particularly important to high flying aircraft, deep freezers and the like.

In bulk solders, the minor alloy-



Preforms like these are used in automatic soldering. Extinguisher piston tubes (right) are being sealed to retainers



How To Get the Best from an Ultrasonic Iron

This man is filling a blowhole in an aluminum casting. Ultrasonic power applied through the molten solder removes surface oxides and permits tinning. Dross rises to the surface and is easily removed by wiping.

Here are ten rules suggested by Ralph Reynolds, technical director, Acoustica Associates Inc., Glenwood Landing, Long Island, N. Y.:

1. **Make certain that the area to be worked is absolutely clean.**
2. **Don't use any flux.**
3. **Don't trap any substance which will give off a vapor.**
4. **Be sure that there is enough molten solder on the bit. It transmits ultrasonic energy to the work.**
5. **Use preheating on large jobs, or for speed on small ones, use gas jets, hot plates or both. Remember that aluminum carries heat away faster than tin plate does.**
6. **Move the iron slowly. Wipe off dross before joining.**
7. **Heat sheet metal evenly—you can permanently deform aluminum with localized heat.**
8. **Don't use butt joints on sheet metal unless you provide supplementary mechanical strength.**
9. **If the joint is likely to be exposed to tropical or excessively humid atmosphere, cover it with a suitable lacquer.**
10. **Don't file the bit. If you keep it clean, it shouldn't be necessary.**

ing elements like bismuth have a pronounced inhibiting effect. High temperatures and lengthy soldering time have the opposite effect.

Fluxes — The efficiency of soldering depends a great deal on the kind of flux you use. Corrosive types fulfill the functions of effectiveness and speed.

Fluxes promote wetting action. An efficient one removes tarnish, prevents reoxidation, lowers surface tension and can be displaced readily by solder.

There are three groups: Highly corrosive, intermediate and noncorrosive. Good soldering practice calls for the selection of the mildest one that will do the job.

Cleveland Electronics Inc., Cleveland, is using an organic flux that changes color when a bond has been made. At 300°F, the melting point, the flux turns brown, telling an operator that the joint has been soldered.

"If you're having corrosion problems from flux residue," advises Kenneth V. Lutz, vice president, All-State Welding Alloys Co., White Plains, N. Y., "remember that there is a simple solution: Wash it in hot water."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Vacuum Materials

Here are some suggestions for investment casters about the use of refractories

REFRACTORIES pose some new problems, but they are giving the investment caster less trouble than he expected.

Refractories commonly used in ordinary air casting will do, says H. O. McIntire, Battelle Memorial Institute, who spoke at the annual meeting of the Investment Casting Institute.

Here are some of his suggestions.

Stable—Magnesia or alumina refractories being used to line melting furnaces are entirely adequate for the iron, nickel, and cobalt alloys which interest most casters today. If operating temperatures exceed 2900°F, zirconia has some advantage over magnesia and alumina because of its greater thermal stability.

Although good vacuum casts have been made in silica investment molds, there is some evidence that most alloys react with them. You can get some protection from precoatings of alumina, zircon or zirconia.

When you reduce pressure to the 1 to 20 micron range, says Mr. McIntire, volatilization and reaction with other materials are most important. Certain oxides, like calcium and thorium, are exceptionally stable from that standpoint. Calcium forms low-melting compounds with some other oxides.

Up to 2500°F, magnesia is the next most stable material. Above 2800°F, zirconia and alumina seem to be better.

Molds—For vacuum melting, the requirements are less exacting than those for melting crucibles.

The most important factor is gassing. A given volume of gas in a metal at atmospheric pressure expands 76,000 times in a vacuum of 1 micron.

This makes shell molding particularly attractive. Both the frozen mercury technique and the glass-cast method (which uses wax patterns) are useful.

If excessive mold reaction and gassing occur when casting, the solution may lie with stable refractories like alumina or zircon.

Girls assemble indium balls onto germanium wafers for the alloying that takes place in the electric furnace at the left. Assemblies ride in stainless steel boats into the furnace inlet (inset). They're conveyed on a stainless woven conveyor belt

Manufacturing Under a Microscope

Tiny parts go into transistors at this RCA plant. Close control during germanium crystal growth and during alloying is a key to success on the production line

MASS production techniques are being pushed to keep up with the market potential for transistors. Perhaps the most significant problem is the need for exact temperature control during the growth of the germanium crystal and during the alloying of indium and germanium to form the cell.

The Harrison, N. J., plant of the Radio Corp. of America produces junction-type transistors in which two tiny balls of indium about 0.010 in. in diameter are alloyed onto opposite sides of a wafer of germanium which is 0.002 in. thick and about 0.125 in. square. The alloying process proceeds simultaneously with the soldering of the germanium wafer to the structural element, which is either a tab of tinned steel or a stamped steel pallet.

Growth—During this process, a zone of germanium-indium alloy grows in toward the central plane of the germanium wafer. These zones must grow to within 0.001 in. of each other without touching. This is the cell (a sandwich of the original germanium crystal between two alloy layers) which is the heart of the transistor.

After the indium balls have been alloyed to the germanium crystal they are known as "dots." The tiny section of germanium crystal is known as the "base." After this assembly emerges from the furnace, tiny lead wires are welded to each indium dot. A third wire connects through the pallet or tab to the base. The alloy layer under one of the indium dots is the emitter, while the alloy layer under the other dot is the collector.

Furnaces — There are two furnaces in production at RCA. Both were designed and built by the Wheelco Division, Barber-Colman Co., Rockford, Ill. The shorter furnace, used for the production of pallet-type transistor assemblies, consists of four 8-in. zones electrically heated by resistors rated at 1000 watts per zone. The heavily insulated furnace operates under a purified dry hydrogen atmosphere.

A welded tubular muffle of special stainless steel runs along the furnace axis. A 1½-in. woven wire belt of stainless steel travels at about 8 in. a minute through the muffle. The muffle extends at the inlet end of the furnace to insure a pure hydrogen atmosphere in the heated zones. It extends about 32 in. past the furnace to provide a cooling zone, which is jacketed with water.

Transistor assemblies are loaded into little boats of chemically blackened stainless steel about 1½-in. long and are spaced about 2 in. through the furnace. Each boat carries 15 assemblies.

Test Trace—Two model 407 Capacitrols are used to control the temperature of zones 1 and 2 of the furnace. One model 402 Capacitrol indicates the temperatures in zones 3 and 4, by switching. Periodically, a thermocouple junction welded into a dummy boat is run through the furnace to trace the extremely critical profile of the time-temperature curve.

The other furnace in this installation is used for assemblies with the tinned tab for structural support and is 96 in. long. It has 12 zones. Furnace and muffle construction, heating coils and their ratings, atmosphere protection and length of cooling zone in relation to furnace length are the same as in smaller furnaces. Belt speed is practically the same, but be-

TINY PARTS . . .

cause the total mass of this particular transistor assembly is less than in the other type, the stainless steel boats are able to carry more parts.

In both instances, the assembly will go through the furnace twice —once to alloy one dot, and again to alloy the opposite dot. When the indium ball is placed on the germanium crystal, it is surrounded by a tiny washer which serves as a mold to keep it in proper location during the alloying.

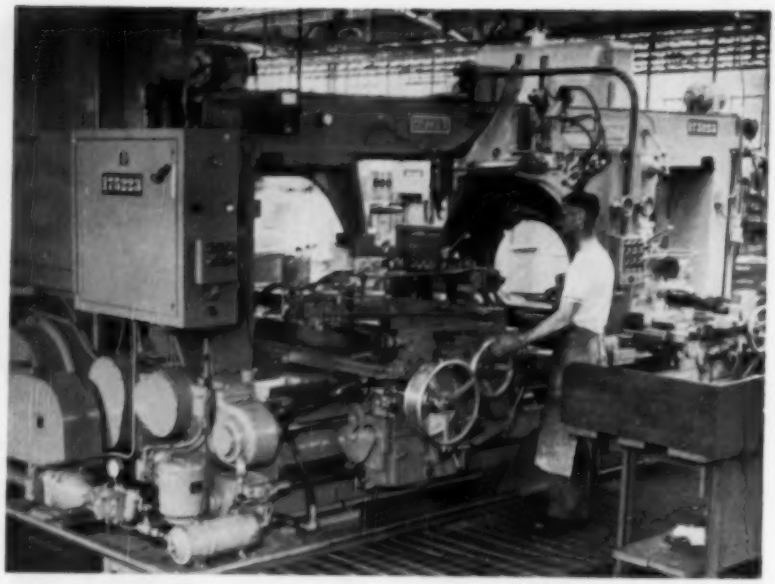
The larger furnace has eight zones under control, with temperature readings of 1130 to 1118°F. Zones 9 through 12 on the second furnace are not under instrument control, but can be read by switching the indicating instrument. The control center carries time signaling devices to give an audible indication to the operators whenever a boat or dummy boat should be placed on the conveyor.

A switch has been installed which permits the temperature in any zone (or in the traveling thermocouple used for control purposes) to feed an external recorder.

Controls—The instruments used for control in this installation are Model 407 Capacitrols used in combination with model 610 Pilots and saturable core reactors. The instrument oscillator circuit output is fed directly into the magnetic amplifier pilot and, in turn, to the control winding of the saturable core reactor.

The saturable core reactor is similar to an ordinary alternating current transformer, but it has an extra direct current control winding. This control winding has the ability to regulate the degree of saturation of the core. Low value signal current flowing in the control winding affects the core saturation so the alternating current winding will have high impedance. The reverse is also true—a high value signal current will produce low impedance in the alternating current winding.

As a result, varying the direct current signal in proportion to the variation of the control set point permits use of the saturable core reactor as variable impedance to control power input to the furnace.



Built by Gisholt Machine Co., Madison, Wis., the machine has cut production time on both compressor and turbine discs at P&W's East Hartford, Conn., plant. It also minimizes distortion by cutting on both sides of the thin discs simultaneously

Lathe Speeds Jet Disc Output

Machine is tracer controlled and center driven. Its success in the production of jet engines prompted Pratt & Whitney Aircraft to order 28 identical units

THIS center-drive lathe has lopped 1 hour 40 minutes off the time needed to machine jet engine compressor discs. The job used to take 281 minutes; it now takes 181.

Thirty minutes have been shaved from similar operations on turbine discs at Pratt & Whitney Aircraft, East Hartford, Conn.

Tolerances—The machine also turns out discs with tolerances closer than they were before. Its ability to cut on both sides of the disc at the same sime contributes to accuracy. By balancing the pressure on each side, the operator can be assured of a flat part. Distortion, always a problem with these large thin discs, is minimized.

Both tool carriages are tracer operated. They're controlled from a template.

During the cut the disc is supported from both sides by rollers. This support and the equalization of forces that comes with cutting on both sides at the same time permit a minimum web thickness of only 0.010 in.

Design—Preliminary design for the machine was headed up by E. P. Bullard, P&W's chief of production engineering. It was built by Gisholt Machine Co., Madison, Wis.

The first machine was delivered to P&W last February. Its success has led to an order for 28 more.

Drive for the machine is a 60-hp Xatron variable speed system built by Reliance Electric & Engineering Co., Cleveland. Replacing the motor-generator set with electronic circuitry, the drive system weighs only one-fourth as much as Reliance's other drives . . . can be mounted on the machine to save floor space.

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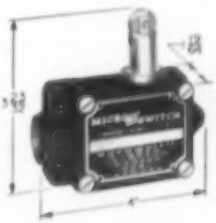
Here is the Type "LS," a small, high capacity two-circuit limit switch. The durable aluminum enclosure protects the switch from physical damage. Seals prevent foreign matter from entering the switching chamber.



High capacity Type "F" enclosed switches are for applications which require a small enclosed switch to handle a large electrical load.

Splash-proof Type "OP" switch assemblies are for locations where splash of liquids would hinder performance of less adequately protected switches.

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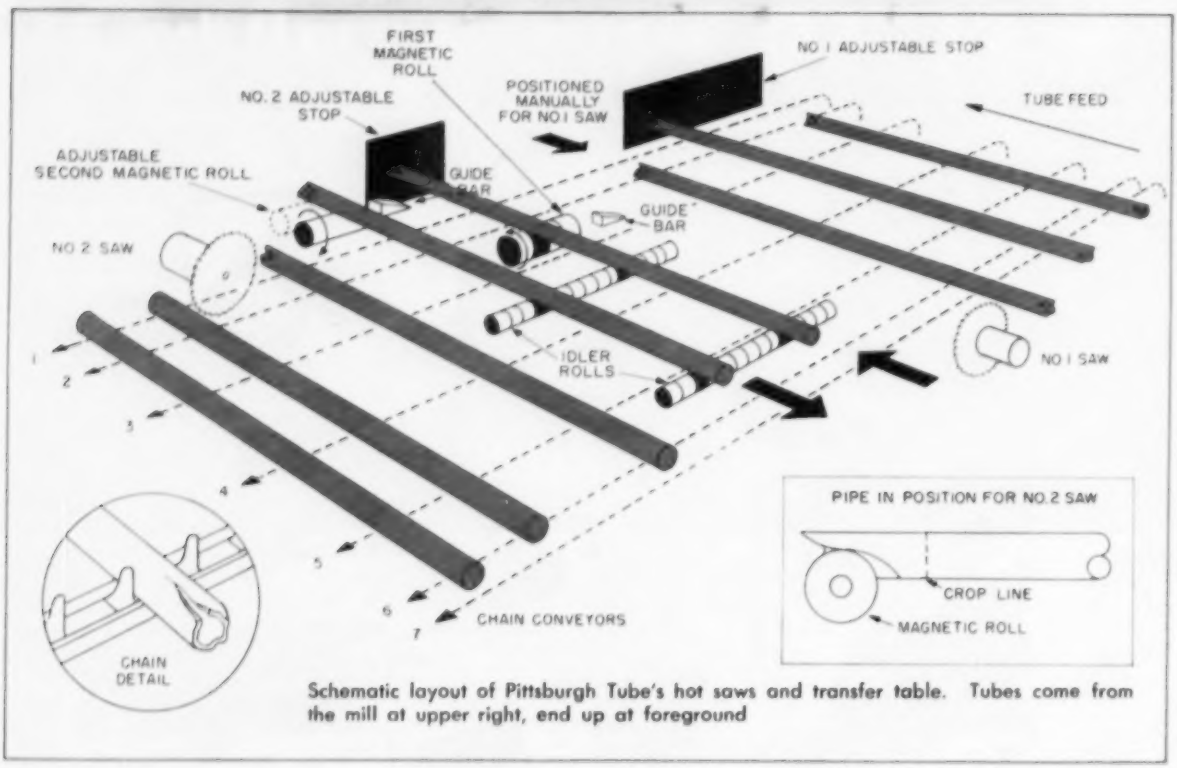

Schematic layout of Pittsburgh Tube's hot saws and transfer table. Tubes come from the mill at upper right, end up at foreground

Magnetic Rolls Cut Crop Loss

Hot saw transfer tables can be improved by better arrangement of adjustable stops and transfer rolls. This firm used magnetism to get a better grip on its tubing

ENGINEERS at the Monaca, Pa., works of the Pittsburgh Tube Co. wanted to reduce the amount of good tubing being lost in hot saw crops. They solved the problem with magnetized transfer rolls which accurately position tubes ahead of the saw. The idea saves 350 tons of steel annually.

Layout—The illustration shows how the hot saw table operates. A length of tubing arrives from the mill (top right). As soon as it touches the first adjustable stop, chain conveyors lift it onto the table. The first stop positions the end of the tubing between chains Nos. 6 and 7 (above). Deformities or burns at that end are cropped manually.

As the tubing approaches saw No. 2, it is lifted by a guide bar onto the first magnetic transfer roll, which moves it sideways to the second adjustable stop. Chains continue to carry the tubing toward the second magnetic roll. A second guide bar lifts the tubing onto the roll, and it moves away from the second stop until the crop or deformed end rests on the roll. Then it is in the correct position for cropping by the second saw.

Crops vary with the size of the tubing. The larger the diameter, the longer the crop. Both the second backstop and the magnetic roll are adjustable for that purpose. With the previous system, lack of adjustment cost the company as much as 12 in. of good tubing in each crop.

Change—When handling tubes which are longer than the distance between the two saws, the second backstop is removed and the first magnetic roll dropped. The first backstop places tube ends between chains Nos. 6 and 7 where they are cropped manually, as before. As the tubing approaches the second hot saw, magnetic roll No. 2 transfers it until the crop rests on the roll.

Magnetism—Ordinary steel rolls usually don't have enough grip to move tubing across the chains. That's especially true of smaller diameter tubing which is light compared with the larger diameters. With a magnetic roll, tubing can be easily moved from side to side.

Each roll is magnetized by an Alnico V magnet supplied by Eriez Mfg. Co., Erie, Pa. A once-a-month cleaning is the only maintenance required.

Don't ever be in doubt...

Just call the one that's in... or talk to the one that's out!

Remember the little weather prophet that used to hang on grandma's front porch? One figure represented cloudy weather and the other fair weather. As one figure came out the other moved back in. Two Ohio Ferro Sales Executives operate the same way except that they both represent fair weather for our customers. One stays at the home office to keep things running smoothly, while the other one is in the field conferring personally with our customers and observing their problems. As soon as the "out" man comes in, the "in" man pops out.

So you see, authority to make important sales decisions for your convenience not only sits at home but it goes abroad to serve you where you are.

It all adds up to better service for Ohio Ferro-Alloy customers.

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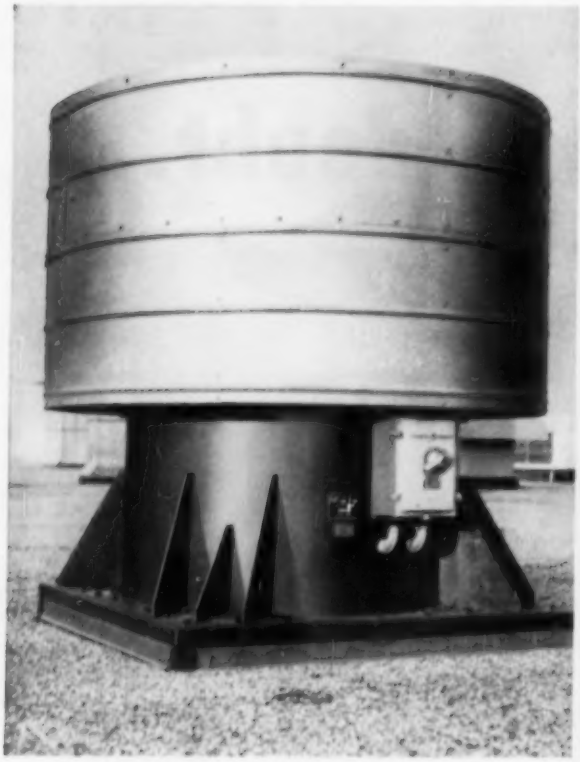
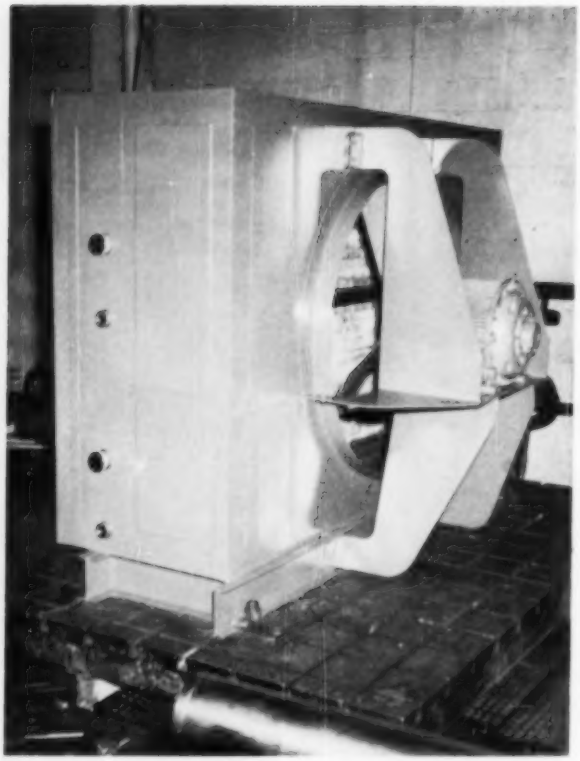


One of sixteen 66 in. units, each rated at 98,000 cfm, installed over enameling ovens in General Electric's Appliance Park, Louisville



One of sixteen 60 in. heaters at the Wabash River Station of Public Service Co. of Indiana. It's rated to heat 60,000 cfm from 0 to 57°F

Roof Ventilators Solve Space Problem

High capacity power ventilators and make-up air heaters put draftfree air where it's needed, allow plant flexibility and keep equipment cost low

GOOD plant ventilation reduces a worker's fatigue and increases his production. It may even help you keep him.

But bulky central ventilating systems and extensive ductwork use up valuable space and are costly. Many companies are going to high capacity power roof ventilators. These units provide the needed ventilation, require no ductwork and save floor space for direct production facilities.

Production Changes—Plant flexibility is another reason for local ventilation. The auto industry is a good example. Model changes require major rearrangements of production equipment.

Roof ventilators are the answer when you can't locate ventilating equipment in outside walls. It's costly to cut through structures and build up curbed roof openings, or to provide them in new buildings.

With high capacity units, such as the Sky-Vent line made by Buffalo Forge Co., Buffalo, the number of roof openings can be kept at a minimum and initial equipment cost held low. This company makes package propeller fan units with wheel diameters up to 120 in. and capacities up to 250,000 cfm.

Installations—Ford Motor Co.'s stamping plant in Chicago is ventilated with 74 power roof ventilators. Each ventilator contains a 42-in. fan.

Sixteen 66-in. units, each rated at 98,000 cfm, are installed over enameling ovens at General Electric Co.'s Appliance Park, Louisville.

Four 84-in. units, each rated at 100,000 cfm, have been shipped to ventilate the Detroit Edison River Rouge power plant.

Air Heaters — Coincident with the demand for high capacity roof

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ROOF VENTILATORS . . .

ventilators, industrial and power plants are finding a need for high capacity make-up air heaters.

Many companies have been adding substantial exhaust ventilation to improve working conditions without adding heating equipment to temper and add fresh air to their plants.

Eliminate Drafts—You can get propeller fan-heating coil packages that serve as make-up air heating units in a power plant and eliminate cold drafts on plant personnel. In one installation, the units are hung near the top of the plant just inside and adjacent to large windows which were removed and replaced by fixed louvers. The units simply discharge heated air into the building structure.

Forced draft fans can be installed at roof level to supply heated make-up air in the winter, and exhaust air during the summer. Such units are made with reversible wheels.

Face and by-pass dampers lower operating costs during summer exhaust use.

Combination—A typical make-up air heater section used in combination with a power roof ventilator has nonfreeze coils and motor operated face and by-pass dampers.

The make-up air unit is mounted directly under the roof opening of the ventilating fan. Air is blown into the plant, heated and discharged to working areas through an adjustable diffuser section mounted on the discharge of the heater.

Stamping Plant—This unit is one of 26 installed in a large automotive stamping plant and is rated at 20,000 cfm heated from 0 to 85°F with 30 lb of steam.

The plant also uses 114, 42-in. ventilator units for summer exhaust, 48 for summer supply and 26 for winter supply to the make-up air units.

A similar application at the Bostitch Co. plant, East Greenfield, R. I., utilizes seven 36-in. make-up air units rated at 16,000 cfm from 10 to 75°F using 5 lb of steam. A 36-in. belt drive propeller fan, which is built into the make-up air unit, pulls in fresh air through intake hoods on the roof.

Throwaway Cutters Gain

This survey shows that the swing to disposable cutting tool tips is only beginning. Spread of the idea to complex cutting tools will increase its attraction

THE THROWAWAY portion of our single-point cutting tool business jumped 21 per cent in the first 11 months this year. It rose 18 per cent in 1955.

Using those figures, Ray W. Ruckel, president, Wesson Co., Detroit, explains the optimism of all tool builders for the future of use-and-discard cutting tips.

Growth—According to a Wesson-sponsored survey of tool users, this growth is only the beginning. The survey revealed that throwaways soon will account for 40 per cent of all single-point tools. Today, the figure is about 15 per cent.

More significantly, these tools will get 60 per cent of the jobs in plants that use them or plan to. In some companies, plans call for throwaway tooling wherever possible. Not a single company reported an intent to cut down its number of applications.

Reasons — These cutting tools don't cut faster, better or deeper than any others. Behind the growth trend are two indirect benefits to the user. First, he can reduce (sometimes eliminate) expensive carbide grinding costs. Second, he may save time on tool changing. Holders can be left in place. The cutting tips are indexed through their series of cutting edges, then replaced.

Mr. Ruckel says the survey shows that industry is even more interested in the throwaway principle on milling cutters and other complex tools. Savings in grinding would be even greater than they are on single point cutters.

Responsibility — "In throwaway tooling, the responsibility for maintenance of tool accuracy is passed on to the manufacturers of carbide tooling. Since carbide makers can make the inserts on a mass production scale, they can effectively use precision automatic equipment to assure a high degree of accuracy on the inserts, despite their low cost.

"This doesn't mean," he cautions, "that plants are going to throw their tool maintenance departments out the window. Well-equipped and well-staffed departments will continue to be used. What the throwaway tooling does is eliminate the need for adding to those facilities. The plant simply adopts such tooling on new operations as they are added . . ."

Better Next Year

Warner & Swasey salesmen at a general sales conference spoke highly of machine tool prospects for 1957.

"In the opinion of most of these men," says L. M. Cole, general sales manager of the Cleveland firm, "the level of manufacturing activity may be even greater next year, barring further international complications."

Areas—New York, Chicago and Los Angeles men were especially optimistic over the prospects for increased buying by the aircraft industry. Pittsburgh and Philadelphia managers figure they can look for more business from electrical equipment makers.

New plants moving to the southwest will boost business there, according to the Houston manager. He also feels the Suez situation, and the resultant demand for oil abroad, will help already busy oil field equipment shops.

In Cleveland, Atlanta, St. Louis and Davenport, Iowa, salesmen are looking to road machinery makers for more business. In Detroit, Dayton, O., and Milwaukee, the salesmen say other machine tool builders may be their best customers.

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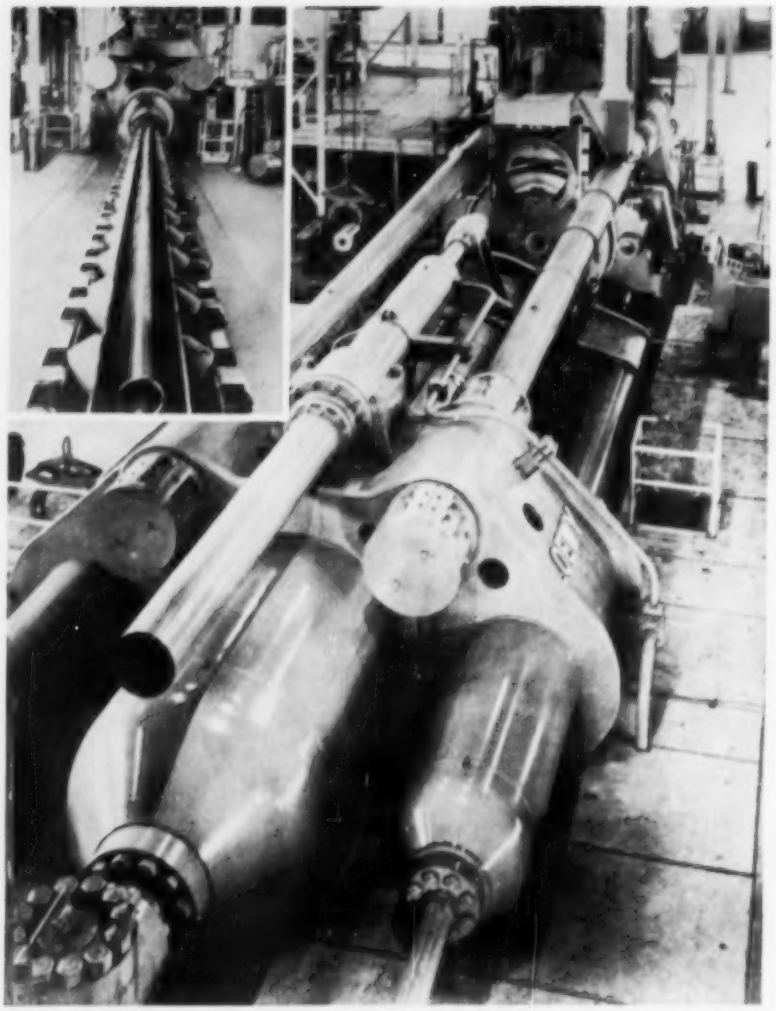
50 Years of Progress 1906 1956

Here's how billets are prepared, heated and extruded. Some tips about die materials and lubricants are included in this concluding article about one of the latest production tools



This is industry's latest tool for extruding titanium. Its capacity (12,000 tons) makes it the world's largest

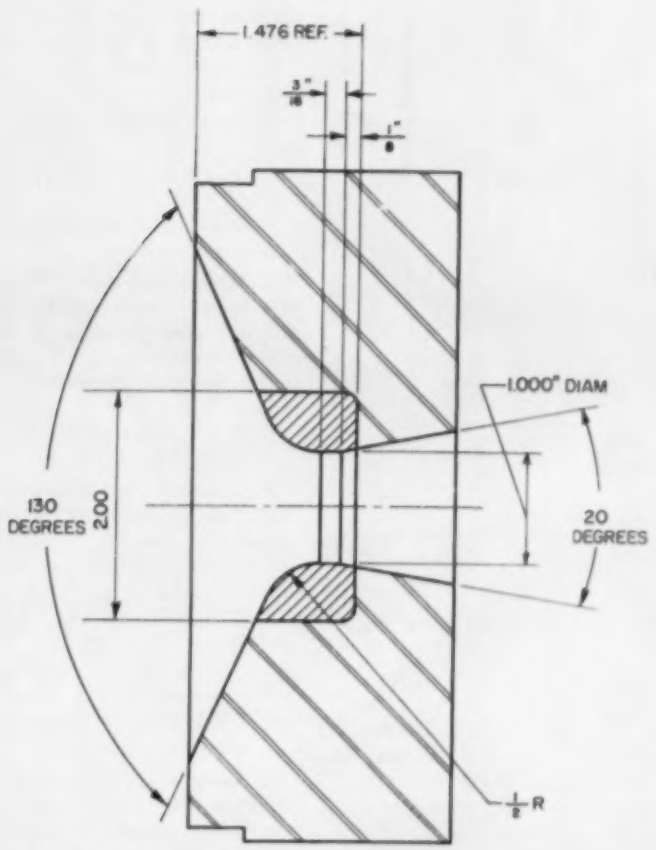
We're Ready for Volume Business,

FOR extrusion, titanium billets need a smooth, all-over machined finish. Most extruders, regardless of the lubricant employed, recommend chamfering the front, outside edge of the billet. This makes for better lubrication, lower breakthrough pressures and avoids edge chilling.

Several extruders find cast or forged billets equally satisfactory. According to Harvey Machine Co., Morton Grove, Ill., no advantage is gained in either mechanical properties or surface finish by using forged instead of cast billets. International Nickel Co., New York, has also extruded cast billets and likes them as well as forged stock.

Hollow billets for tubes are prepared by two methods: Machining and piercing. Holes smaller than 2 in. in diameter must be machined. For larger inside diameters, hollow billets may be pierced prior to extrusion.

Equipment—Babcock & Wilcox, Beaver Falls, Pa., uses a separate vertical press for piercing. This makes it possible to pierce a slightly oversized hole. A larger (and stiffer) mandrel reduces wander.



Here is the cross section of a typical die which extrudes rounds. Inserts shown are tungsten carbide which reduce wear

Say Extruders of Titanium

Length is limited to about seven times the diameter of the pierced hole.

Prior to piercing, the billet is completely upset in the container cavity to avoid random displacement of metal during the piercing stroke and to insure concentricity. By using a separate press, it is possible to place the billet in the press container so that the first end pierced faces the die. That method cuts down wander.

Currently, B&W's machined billets are degreased and steam cleaned prior to heating. For piercing, glass lubricates the mandrel. Since there is little movement between the billet and container, grease is satisfactory for container lubrication. The pierced billet is surface conditioned and, if necessary, machined before reheating.

For extrusion with greases, hollow billets must be prepared by machining. Glass affords greater protection to the mandrel, produces longer tubes with a better over-all surface.

Billet Heating—Billets must be nearly scale free. With grease lubricants, only a thin film separates the billet from the tools and heavy oxide scale causes excessive tool wear. It also has an adverse effect on surface finish. The original patents for the glass process also specify that scale-free billets must be used.

Direct immersion in molten salt has several serious disadvantages:

1. Neutral chloride heat-treating salts attack titanium surfaces rapidly, lead to deep pitting.
2. The film of salt which adheres to the billet is carried into the extrusion container, affects the lubricant, reduces tool life.

Reynolds Metals Co., Phoenix, Ariz., and Curtis - Wright Corp., Buffalo, employ salt baths, but avoid direct salt contact by placing the billet in a closed bucket which is partially submerged. An argon atmosphere is maintained over the billets during heating.

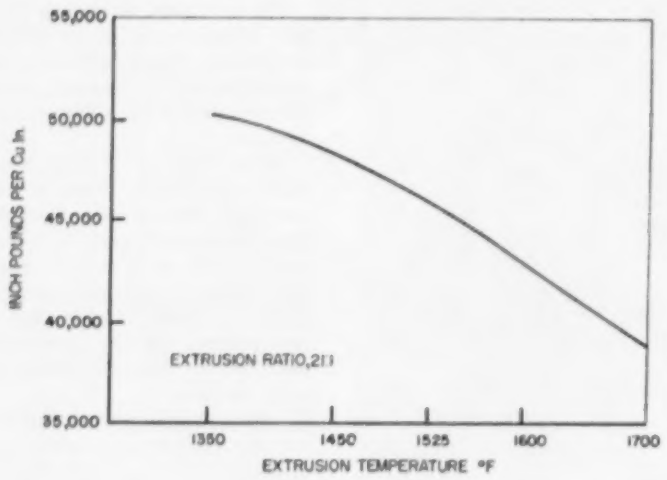
Babcock & Wilcox uses: 1. Direct immersion in a salt bath. 2. Low-frequency induction. 3. Argon atmosphere in a muffle furnace. 4. Gas-fired furnace with groundcoat enamel applied to the billets. The best results have been obtained with the muffle furnace and argon atmosphere.

Many extruders are paying attention to low frequency (60-cycle) induction heating. It's flexible, rapid, efficient and easily adapted to automatic operation. Scale formation is slight and inert atmospheres minimize oxidation.

The major disadvantage of induction heating used to be inaccurate temperatures. Control has been improved markedly. The result: More uniform heating.

Not much oxidation can occur with copper-jacketed billets, so special heating methods are not required. Chase Brass & Copper Co., Waterbury, Conn., gets satisfactory results in a gas-fired furnace with a slightly oxidizing atmosphere.

Die Design—There are two types



As temperature rises, pressure needed to extrude goes down. Here's how it works for the Ti-3Mn-complex alloy

of flow during extrusion:

1. Uniform or parallel, in which the skin of the billet becomes the skin of the extrusion.
2. Shear or nonuniform, in which the skin penetrates the billet. (It creates a stagnant zone of metal at the die shoulder and is retained in the container as discard.)

Shear flow is undesirable. It prevents effective lubrication and can cause interior laminations and surface defects.

In the extrusion of round bars with grease lubricants, you can get uniform metal flow with conical dies. Battelle's studies indicate that the best results are obtained if the die has an included angle of 130 degrees and a radiused opening. It produces uniform metal flow, better die lubrication and less pickup on the die. Surface finish is markedly improved with lower extrusion pressures.

Because glass is more effective than grease, deformation is easier. Bridgeport Brass Co., Adrian, Mich., finds that the extent of extrusion piping seems to be an inverse function of the efficiency of the extrusion lubricant. Intricate die designs are not required to overcome unbalanced flow. The same basic design is used for rounds, tubes and shapes with only slight modification.

Materials — The extrusion of small lots is economical. If die life is short, it can lose its cost advantage quickly. In selecting a die material, cost and life must be balanced.

For extruding, the characteristics of a die material depend on the lubricant. Greases offer little protection from high temperatures.

The material used with greases must have:

1. Good thermal shock resistance.
2. High hot hardness and strength.
3. Good high-temperature abrasion resistance.

Materials that resist galling and seizing are desirable. Excessive grinding and polishing to remove pickup is not only costly but eventually destroys dimensional accuracy.

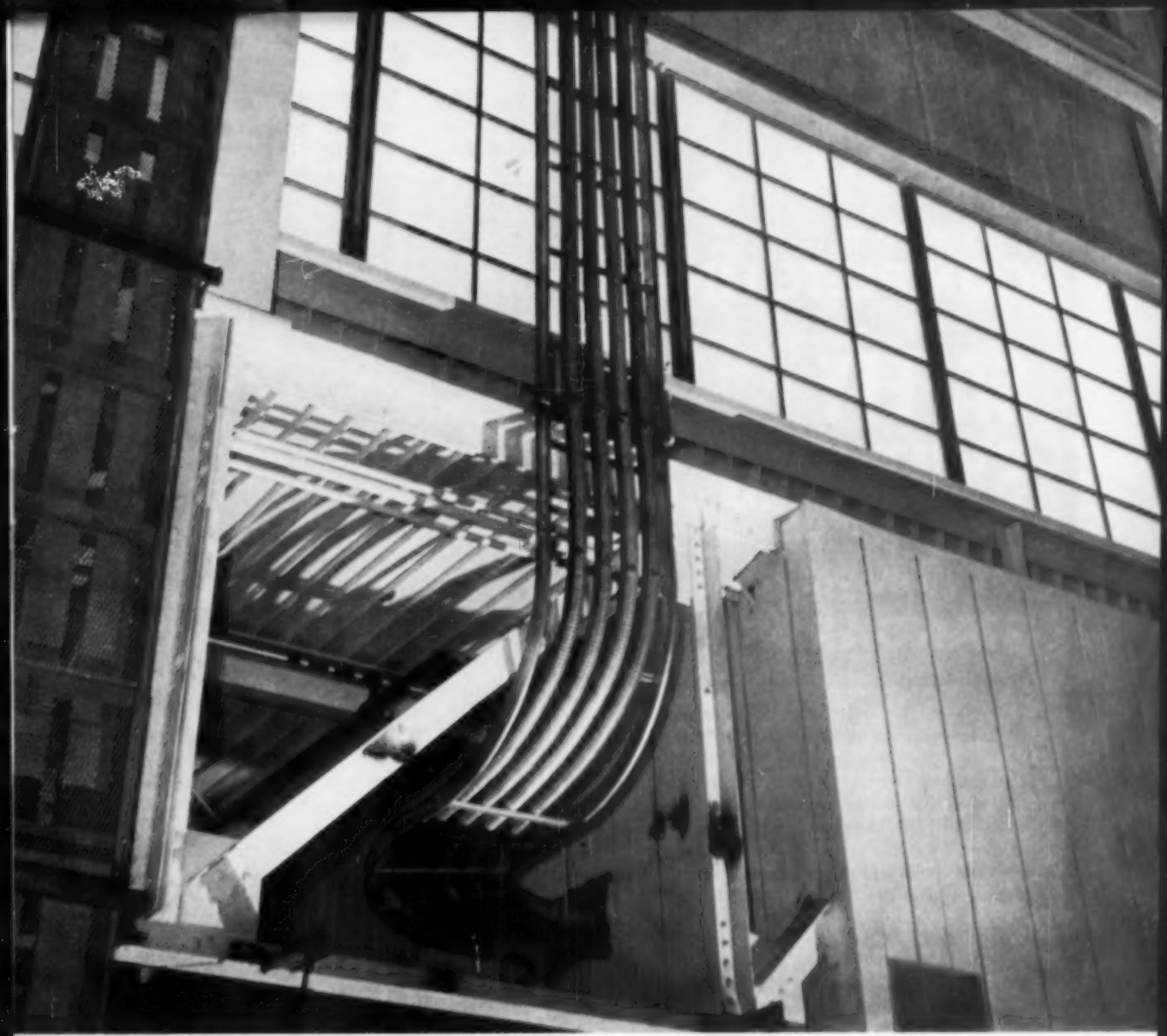
Here are some of the die materials employed:

1. Hot-work tool steels, such as the 5-chromium and 9-tungsten types.
2. High-speed tool steels, such as 18-4-1 and 18-4-2-8 types.
3. High-carbon, high-chromium cast steels.
4. Cobalt-base alloys.
5. Titanium carbides.
6. Chromium carbides.
7. Hard-facing alloys.

Properties — The hot-work tool steel are relatively inexpensive and easy to fabricate, but have relatively poor high-temperature characteristics. High-speed tool steels and cast steels are intermediate in both cost and high temperature

Approximate Maximum Extrusion Temperatures

Alloy	Temperature, °F
Ti-2.2Fe-2.1Cr-2Mo	1500
Ti-3Mn-complex	1500
Ti-3Al-1.5Mn	1750
Ti-3Al-5Cr	1750
Ti-5Al-2.75Cr-1.25Fe	1750
Ti-4Al-4V	1750
Ti-4Al-4Mn	1750
Ti-6Al-4V	1750
Ti-7Al-3Mo	1800
Ti-5Al-2.5Sn	1900



FLEXIBLE Anaconda Interlocked-armor Cable is installed quickly, without rigid conduit. Machines are ready for production days, often weeks sooner.

How to go from vacant space to full production quicker

If you need to expand facilities today, or relocate machines, new types of cables can save you time and money.

The interval between decision to expand and 3-shift production can be an agonizing wait or a pleasant surprise for management. Much depends on plant wiring.

A flexible plant electrical system enables management to expand quickly into new space as it's needed. Or to speed rearrangement of machines when models or styles of products are changed. Here's where modern Anaconda power cables can save you time and money.

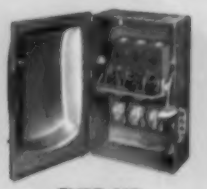
ANACONDA Duralox* Interlocked-armor Cable, for example, ends the laborious and expensive process of installing rigid conduit. This cable has its own rugged, flexible metal covering . . . needs nothing more. It is installed quickly—indoors or out—in long, unbroken runs . . . is always accessible, 100% salvageable. Not only does it get you back into production sooner, it costs less installed.

The Man from Anaconda can give you many helpful suggestions on your plant wiring. And he will be glad to work with your engineers in selecting the *right* cables for the job, and to help increase the flexibility and efficiency of your electric system. Offices in 27 major cities—or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y. *Reg. U. S. Pat. Off. 58298

ASK THE MAN FROM **ANACONDA®**
ABOUT **POWER CABLE**

FIRST with a COMPLETE LINE OF SAFETY SWITCHES to meet the NEW NEMA STANDARDS

TYPE HD



TYPE ND

TYPE LD

• The table below shows Square D switches meeting new industry specifications. Notice how they clarify conflicting features which existed under old designations. Notice, too, that they establish a new, heavy-duty industrial switch, Type HD.

One important thing which remains unchanged is the **DESIGN LEADERSHIP** which has made **SQUARE D SAFETY SWITCHES** industry's overwhelming **FIRST** choice for more than fifty years. Compare them, feature for feature. They cost no more, why settle for less?

DESCRIPTION	HEAVY DUTY New	NORMAL DUTY formerly Types H, S, or A	LIGHT DUTY formerly Types D or G
Rating-Ampere Voltage	30—600 250 or 600V AC, DC	30—1200 250 or 600V AC, DC	30—200 250V AC
Enclosure	NEMA 12 • Industrial Use (Gasketed) NEMA 4 & 5 • Water-tight & Dust-tight NEMA 7 • Explosion-resisting Class I—Group D NEMA 9 • Explosion-resisting	NEMA 1 • General Purpose NEMA 3R • Raintight	NEMA 1 • General Purpose NEMA 3R • Raintight
Horsepower Rating	NEC Fuse Ratings Dual-Element Fuse Ratings	NEC Fuse Rating Dual-Element Fuse Ratings	NEC Fuse Rating
Operating Mechanism	Quick-Make, Quick-Break Independent of Handle	Quick-Make, Quick-Break Independent of Handle	Positive Make, Positive Break Spring Assisted
Cover	Interlocked & Padlock Attachment	Interlocked & Padlock Attachment	Padlock Attachment
Plating—Current Parts	Extra-Heavy Silver	Silver	
Endurance	Maximum Endurance Far Exceeds UL Standards	Exceeds UL Standards	Meets UL Standards

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE!

SQUARE D COMPANY

properties. The cobalt-base alloys, carbides and hard-facing alloys are the most expensive and most difficult to form, but have the best high-temperature properties.

For extruding rounds, the carbides appear to be the most satisfactory die material. In Battelle's studies, carbides exhibited the best high-temperature abrasion resistance and the least tendency to seize. The greatest amount of wear and pickup occur at the edge of the die opening. To reduce material and machining costs, carbides are employed as inserts, either shrunk or press-fitted in a high-tungsten tool steel casing.

On the basis of surface finish and dimensional accuracy only, Reynolds has found hardfacings to be most applicable for extruding shapes. The hardfacing, a Cr-Co-W alloy, is applied to a 5Cr, hot-work tool steel. Complete bonding to the base metal must be obtained or the hardfacing will spall. Reynolds uses split dies to facilitate application of the hardfacing and the grinding of the die recesses.

Chase, in its work with copper-jacketed billets, currently uses a 9W hot-work tool steel for dies and a 5Cr steel for mandrels. These perform satisfactorily as long as the jacket remains intact and only copper is in contact with the die.

Glass—A die material used with glass need not have such good high-temperature properties. Generally, the common, hot-work tool steels perform satisfactorily. Either the 5Cr or 9W types have been used by most extruders. The 9W type is generally preferred for mandrels.

According to Babcock & Wilcox, die wear is considerably greater when extruding shapes than when extruding tube. Tube dies have had roughly twice the life of shape dies.

The most serious wear problem has been with mandrels. Pickup is greatest with commercially pure titanium; alloys, like Ti-6Al4V seize less.

Die life depends on the effectiveness of the glass in preventing metal-to-metal contact. Unless there is breakdown of the lubricating film, die wear should be the result of deformation because of pressure and movement of the metal and, to a slight extent, abrasion by the glass.

Extrusion Speed — At present, titanium is extruded on presses designed for aluminum, brass or steel. Several companies have direct-drive presses with maximum ram speeds of around 40 to 80 in. per minute. Others have accumulator-drive presses that are capable of ram speeds of 300 to 700 in. per minute. Extrusion speed (exit rate) varies in commercial practice from several hundred to several thousand inches per minute.

It has not been established clearly whether there is a range of extrusion speeds which will produce maximum surface quality. Opinion is that titanium should be extruded at high speeds on presses having ram speeds of several hundred inches per minute.

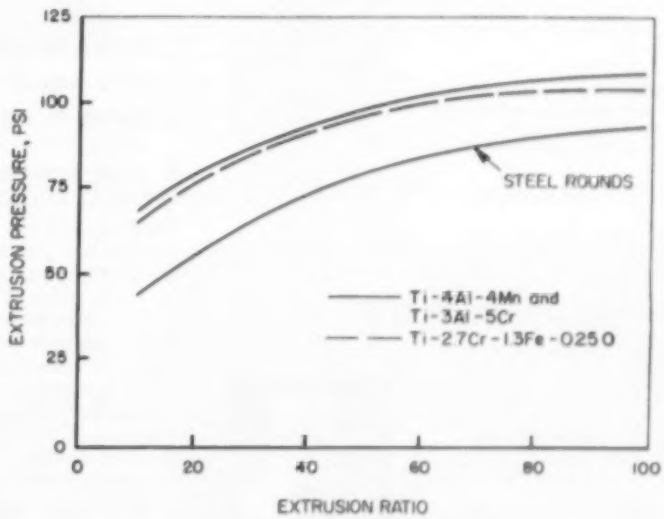
High speeds are preferred whether grease or glass is used, though for different reasons. Greases offer little protection from high temperatures, so the hot billet should be in contact with the die for as short as time as possible. The billet should be in contact with the container for the shortest time possible to minimize cooling. Otherwise, serious variations in the structure and properties of the extrusions may occur.

With glass as the lubricant, those problems are not as severe because it is an insulator. The basic principle of glass lubrication requires high extrusion speeds. With low speeds, the glass reservoir may be depleted before completion of the stroke.

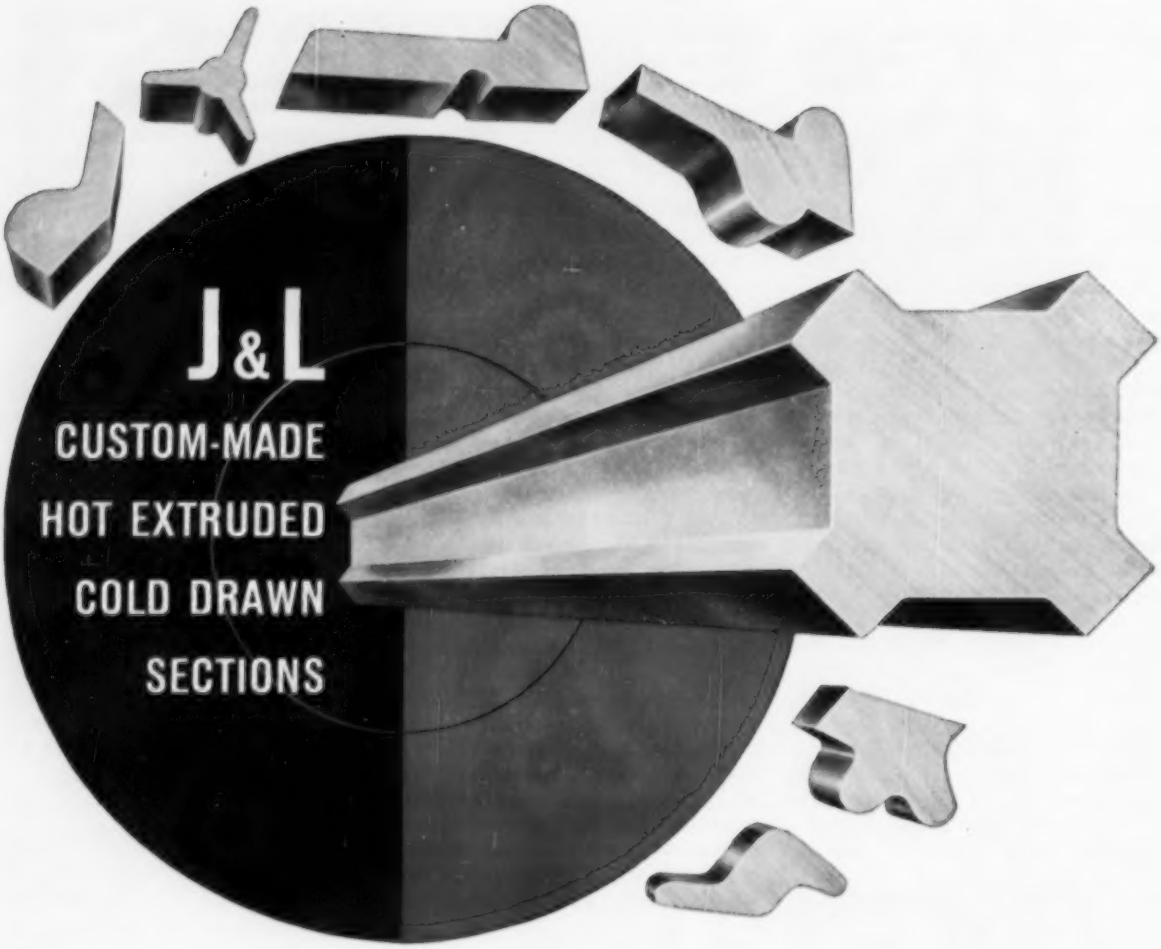
Scrap Recovery—Companies extruding with the glass process enjoy higher yields than those extruding with grease. First, longer billets can be extruded with glass which reduces the percentage of the billet weight retained as discard. Second, the specifications for engine shapes and tubes, which constitute the principal market for the glass process, are less rigid than for airframe shapes, and the percentage of acceptable material is greater.

Most extruders have had yields in excess of 80 per cent. Babcock & Wilcox reports recovery of metal from billet to tube of 90 per cent or greater. For simple shapes, Bridgeport Brass has obtained recoveries of 90 to 95 per cent.

• An extra copy of this article, and Part I which appeared last week, is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.



The further you reduce the billet in one squeeze, the more pressure you need. The three alloys shown are compared with steel



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3. **Eliminate the cost of castings and forgings** of intricate sections requiring considerable machining
4. **Reduce inventories** due to quick availability of extruded sections from the J&L plant

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The mechanical properties of J&L Extruded Sections are equal to or superior to those obtainable from equivalent grades conventionally cold drawn. Cold drawn tolerances are accurately maintained. The excellent surfaces of these Extruded Sections require little—if any—finishing operations.

Send us your inquiry for prompt and efficient J&L service.

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STEEL CORPORATION · PITTSBURGH

Stock Loader Boosts Production of Bar Automatics

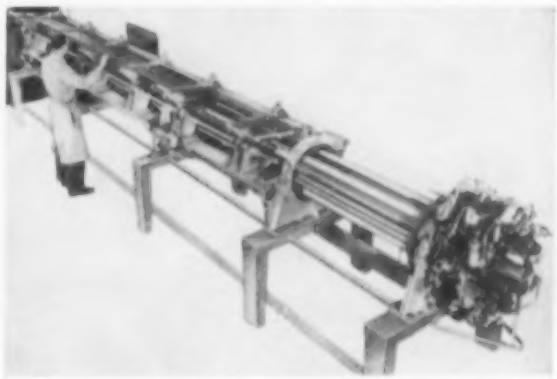
This bar feeder automatically indexes to as many as eight positions on bar automatics, holds several hours' supply of stock, ejects remnants and reloads automatically.

In a field test, the multiple-spindle feeder performed at 96 per cent of gross-geared production capacity.

Operation requires no manual adjustment during a production run.

Stock can be loaded into the magazine at any time.

The feeder revolves with the spindle head of the bar automatic. Stock sizes of ¼ to 2 in. can be handled. *Write*: Lipe-Rollway Corp., Syracuse, N. Y. *Phone*: 75-3131



Sheet Polisher Makes 80 Strokes a Minute on Stainless

Model 43-R3 is an automatic stroke polisher which handles either 2B roll mill sheets or formed flat surfaces. It produces a long scratch pattern equivalent to a No. 4 finish or better. The automatic finish is easy to simulate by hand.

A hydraulic system powers the traveling head at eighty to ninety 8-ft strokes a minute. The abrasive belt is 6 in. wide and is backed up with a buff roll which provides the soft pressure needed for a uniform finish.

The machine can remove welds and scale and do surface cleaning and filler sanding. *Write*: Curtis Machine Division, Carborundum Co., Jamestown, N. Y. *Phone*: 61-551

Offset Routing and Overlay Template Work Made Easier

The Rigidmil router does not depend upon the operator to supply the force required to feed the cutter through the work.

An assisting mechanism provides power for all three basic movements. The four-speed vertical spindle head is rated at 15 hp and 7200 rpm.

Feed and rapid traverse rates are determined by the pressure exerted on the power-assist handles.

Longitudinal movement of the gantry and traverse movement of the saddle are controlled by the operator through the power-assist mechanism.

The spindle center covers a 5 x 12 ft area. *Write*: Sundstrand Machine Tool Co., Rockford, Ill. *Phone*: 2-4477

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NEW PRODUCTS and equipment

Gear Inspector

Red Wing Model GSR is an electronic sound testing unit. A built-in electronic ear automatically inspects the operating sound levels of gears.

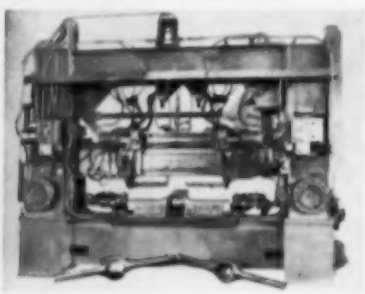
Gears 7/8 to 3 in. in diameter can be tested. They are automatically loaded, run in both directions in mesh with another gear (with and without brake loading), unloaded and passed or rejected by the sound discriminator unit (its microphone is near the gear mesh area). *Write*: National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone*: Walnut 1-8980

Carbide

Firthite NHA is recommended for machining cast iron, aluminum, brass and plastics. It is resistant to land wear and has good twisting and brazing qualities. *Write*: Firth Sterling Inc., 3113 Forbes St., Pittsburgh 30, Pa. *Phone*: Museum 2-4600

Submerged Arc Welder

This automatic unit welds simultaneously with four heads mounted on a platen. Techniques and tooling are adaptable to a variety of high production applications, although the unit was designed for welding traverse seams in automotive rear axle housings.



The machine simultaneously clamps the two parts to be welded. After the welds are completed, an automatic ejector loosens the completed part from the fixture. *Write*: Swift-Ohio Corp., 8095 Livernois, Detroit, Mich. *Phone*: Texas 4-0120

Induction Heater

Model L6E is a 2-kw unit that can be used for soldering, brazing, hardening, annealing and other production operations.

The heater has a built-in output transformer for matching a variety of load shapes and sizes. A wide range of choices is provided by the built-in automatic recycling heat cycle timer.

The unit has protective interlock switches on all access doors and low voltage output circuits which are grounded. *Write*: Reeve Electronics Inc., 609 W. Lake St., Chicago 6, Ill. *Phone*: Randolph 6-9755

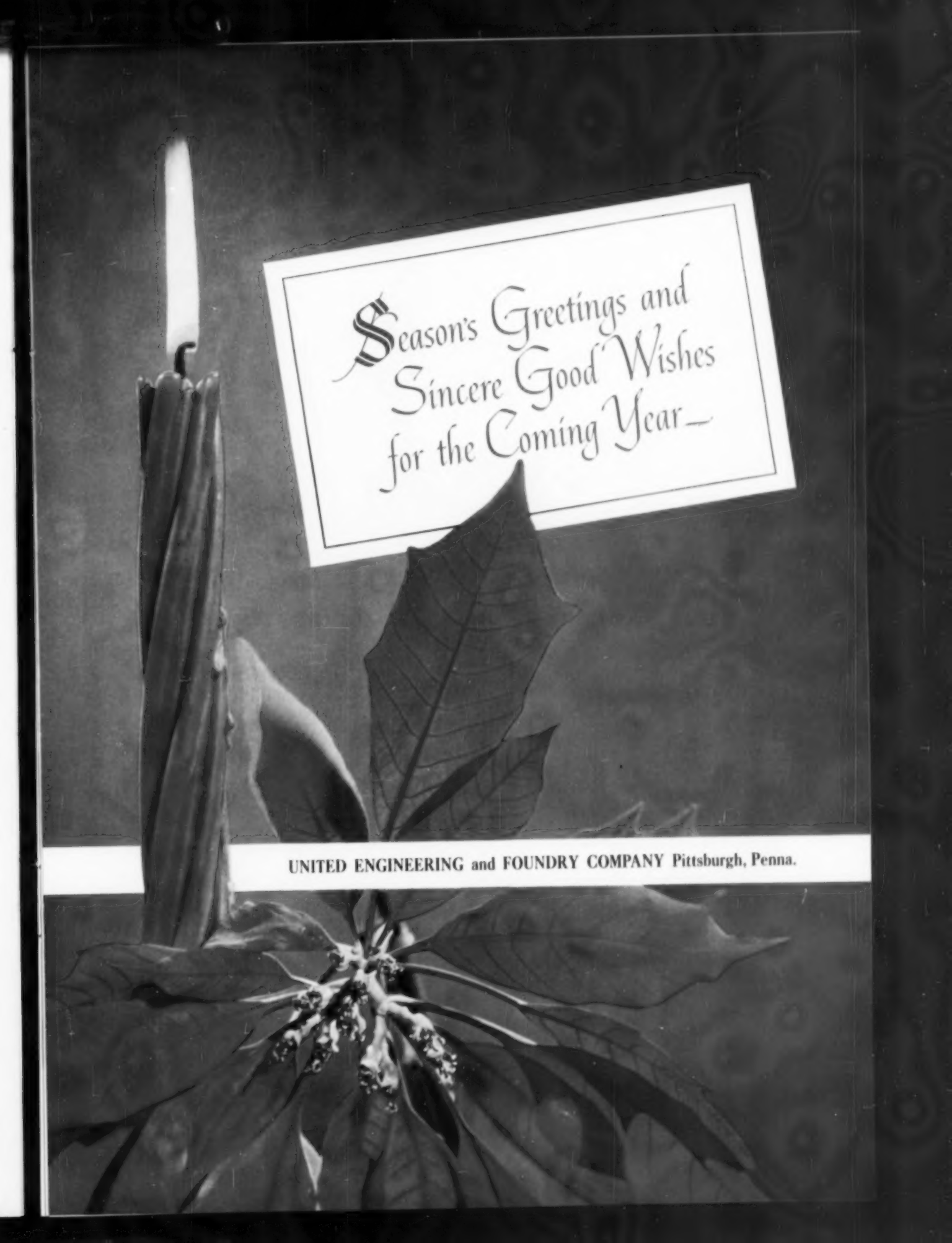
Multiple Drive System

The Varidyne system co-ordinates machinery, conveyors and other multiple drive operations.

The power unit illustrated has the drive motor and alternator on the same side to save space. The unit provides variable frequency power to the motors in the system, thus linking them electrically.

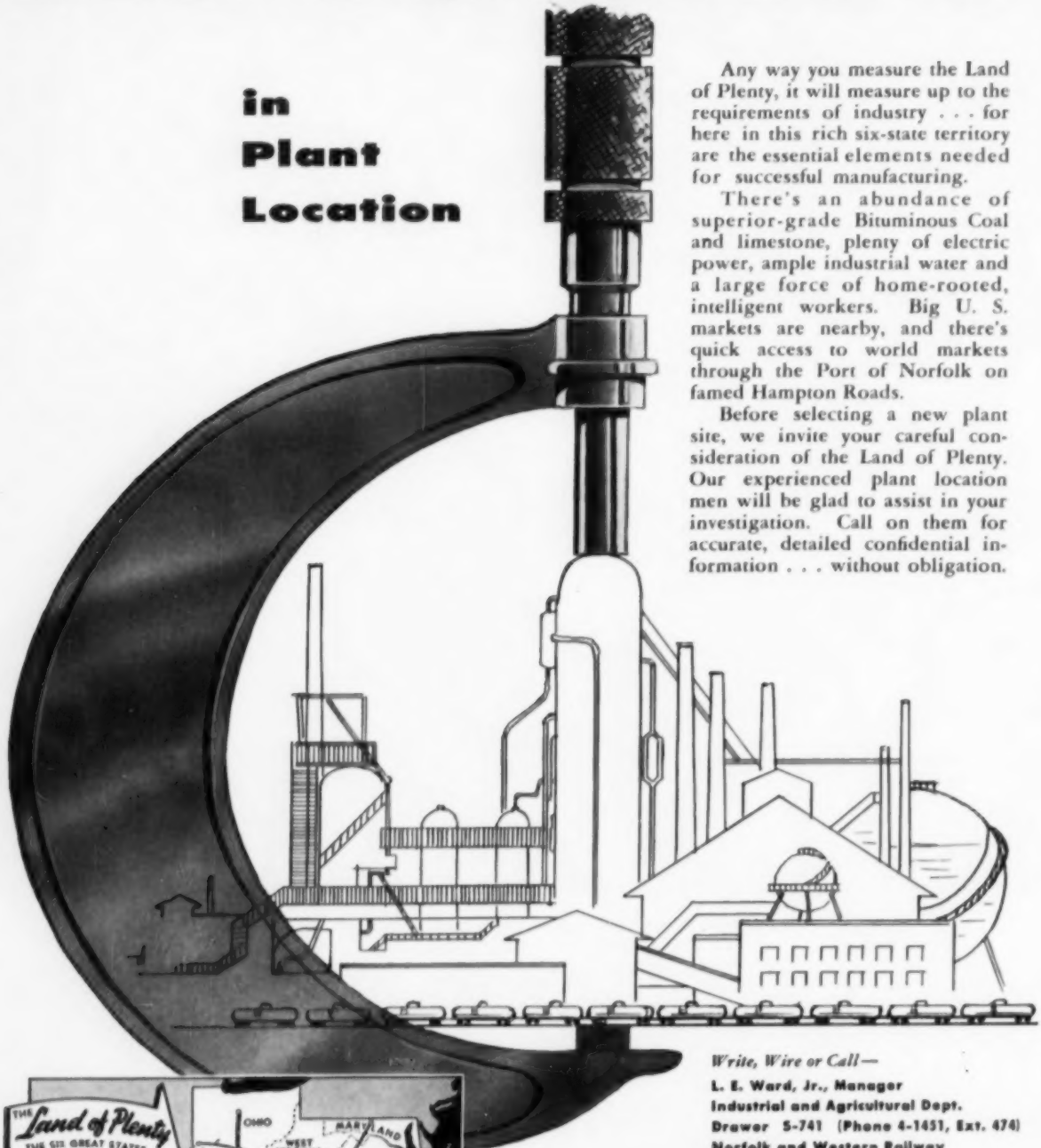
The alternator, driven at variable speeds, generates a frequency proportionate to its speed and transmits this frequency to each of the motors in the system.

A handwheel changes speeds at the power unit to affect each motor in the system equally and simul-


Season's Greetings and
Sincere Good Wishes
for the Coming Year—
UNITED ENGINEERING and FOUNDRY COMPANY Pittsburgh, Penna.

ACCURACY

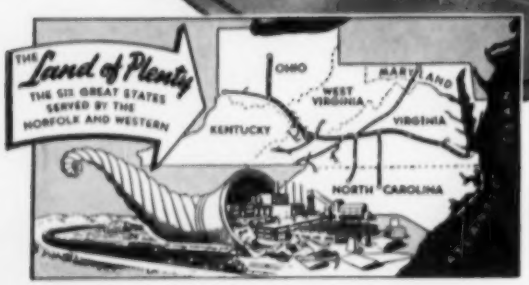
in Plant Location



Any way you measure the Land of Plenty, it will measure up to the requirements of industry . . . for here in this rich six-state territory are the essential elements needed for successful manufacturing.

There's an abundance of superior-grade Bituminous Coal and limestone, plenty of electric power, ample industrial water and a large force of home-rooted, intelligent workers. Big U. S. markets are nearby, and there's quick access to world markets through the Port of Norfolk on famed Hampton Roads.

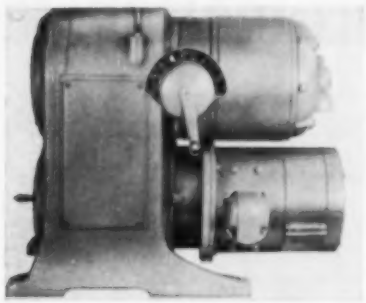
Before selecting a new plant site, we invite your careful consideration of the Land of Plenty. Our experienced plant location men will be glad to assist in your investigation. Call on them for accurate, detailed confidential information . . . without obligation.



Write, Wire or Call—
L. E. Ward, Jr., Manager
Industrial and Agricultural Dept.
Drawer 5-741 (Phone 4-1451, Ext. 474)
Norfolk and Western Railway
Roanoke, Virginia

Norfolk and Western RAILWAY

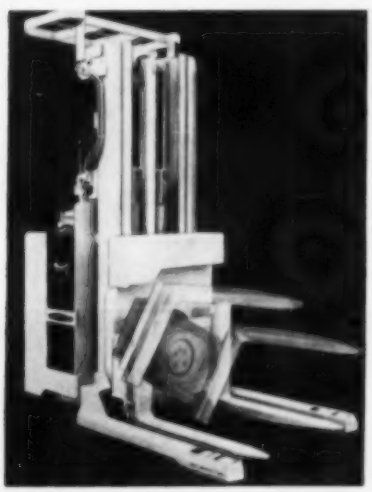
NEW PRODUCTS and equipment



taneously. *Write*: U.S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif. *Phone*: Adams 3-3131

Revolving Fork Truck

The revolving feature of this truck enables it to dump small parts into hoppers. When the forks are in a normal position, the truck is used to stack boxes in storage areas.



A hand operated hydraulic valve controls the forks which move 360 degrees clockwise or counterclockwise. *Write*: Raymond Corp., 91-147 Madison St., Greene, N. Y. *Phone*: Greene 201

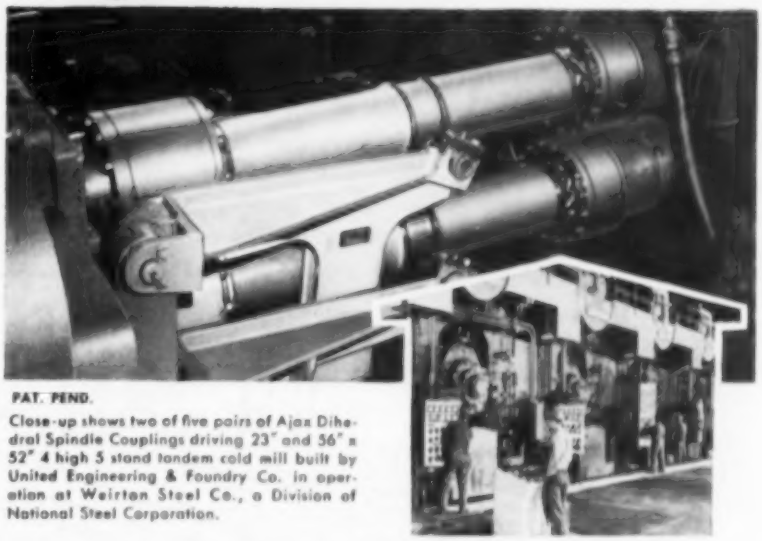
Thrust Bearing

This single-acting thrust bearing has a load capacity of 116,000 lb at 200 rpm, 76,500 lb at 700 rpm and 67,800 lb at 1000 rpm.

The thrust load is carried at right angles to the roll axis on 90 short cylindrical rollers. One roller, longer than the other two in

AJAX

DIHEDRAL SPINDLE DRIVE COUPLINGS HANDLE SPEEDS UP TO 7200 FPM



PAT. PEND.

Close-up shows two of five pairs of Ajax Dihedral Spindle Couplings driving 23" and 56" x 52" 4 high 5 stand tandem cold mill built by United Engineering & Foundry Co. in operation at Weirton Steel Co., a Division of National Steel Corporation.

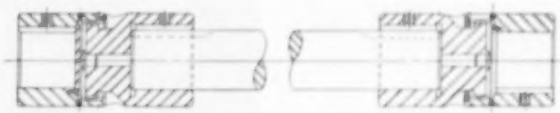
● One of America's newest and most talked about mills is driven by ten Ajax Dihedral Spindle Couplings.

This 23" and 56" x 52" 4 high, 5 stand tandem cold mill is turning out sheet of high quality finish and maintaining close gauge tolerance at speeds up to 7200 fpm.

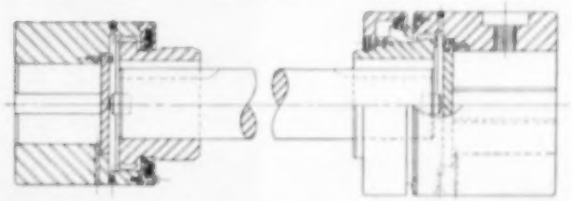
Uniform angular velocity made possible by Ajax Dihedral Spindle Couplings is an important factor in the performance of this high speed mill built by United Engineering & Foundry Co. for Weirton Steel Co., a Division of National Steel Corporation.

Each of these couplings delivers 2500 hp between drive stand and rolls.

The proven performance of Ajax Dihedral Spindle Couplings is writing new standards into the specifications of mill builders and new figures into the production and maintenance cost records of mill users.



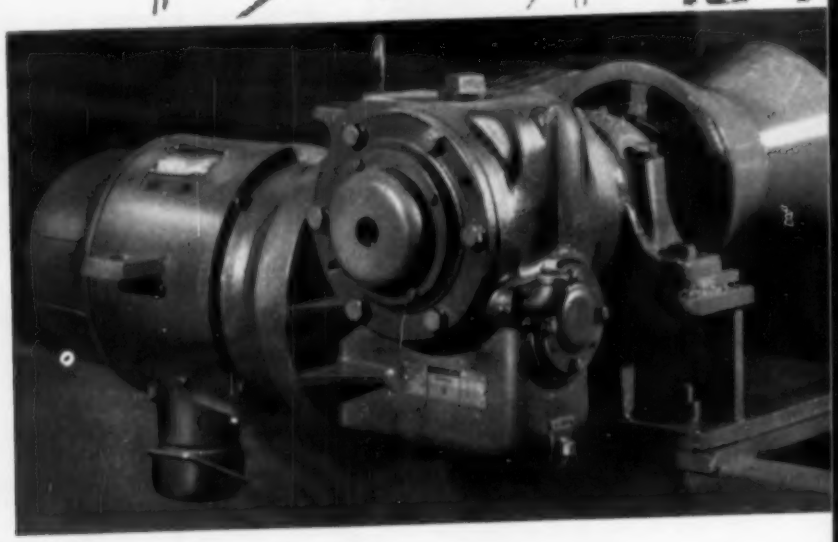
Sketch shows 9" diameter by 5'6" overall length Ajax Dihedral Spindle Coupling. Arranged for booted lubricant retainer seal.



Showing Ajax Dihedral Spindle Coupling 6'4½" overall with 15⅛" diameter coupling on roll end and 13⅛" diameter coupling on drive end.

AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, N. Y.

Seamless tube delivery gets **Triple protection in**



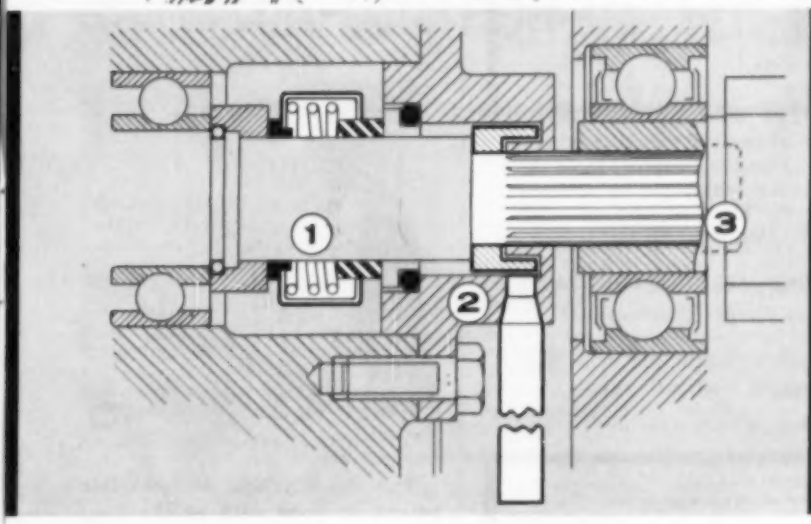
Westinghouse floating gearmotors

Westinghouse floating shaft gearmotors have undergone the critical tests of 24-hour-a-day, run-out table operations. Typical results come from a seamless tube drawing, tempering and annealing operation. Here, Westinghouse units bring three-way protection against the always-present problems of oil leakage and motor changes.

Two separate seal systems guard against oil leaking from the gear unit into the motor. An indicating feature warns of seal wear, before failure, in time for preventive maintenance.

Westinghouse splined shaft coupling permits easy separation of motor and gear assembly in seconds. Valuable inspection time is saved and motor changes can be made on the job, reducing down time.

Shock-absorbing spring mounting and rugged construction make Westinghouse floating-shaft gearmotors extremely tough . . . but why not see for yourself in Booklet B-6370. Call your local Westinghouse sales engineer for a copy, or write Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa. J-07354



1. A combination labyrinth-packing and face-type seal on the pinion shaft prevents oil leakage from the gear housing into the motor.

2. For added protection an umbrella seal and drain catches any leakage through a worn shaft seal. Visual indication of seal wear is given by the drain.

3. The simple spline connection between motor and gear shafts permits fast demounting of the motor without disturbing gears or bearings.

YOU CAN BE SURE... IF IT'S Westinghouse

each slot, is staggered to equalize distribution of wear.

Rollers are accurately spaced in a machined bronze retainer and compactly secured by a heavy steel band enclosing the retainer's outer edge.

All radial rollers are crowned to relieve roller ends. High stress points are eliminated. *Write*: Rollway Bearing Co., 541 Seymour St., Syracuse, N. Y. *Phone*: 75-2121

Arc Welding Electrode

Strikeasy 610 is an E6010 mild steel electrode with an iron powder coating. It is recommended for field construction (pipelines, ship fabrication and pressure pipe welding), fabrication of tanks and pressure vessels, repair of steel castings and the welding of machinery parts.

The iron powder particularly improves weld quality in root passes. Slag offers no interference in confined joints or vertical down welding. It is easily removed from weld deposits.

The electrode coating gives a stable arc and improves shielding. *Write*: Welding Department, General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Coupling problem?
THOMAS will help select your coupling

FLOATING SHAFT
BMR—for heavy duty service where excessive misalignment is expected

DOUBLE FLEXING
DBZ—for high speed, heavy duty drives

SINGLE FLEXING
SS—for engine-driven generator sets, especially with outboard bearing

DOUBLE FLEXING
AMR—for engine and medium speed drives

Your Thomas Sales Engineer, backed by 40 years of coupling experience, will help you select the correct type Flexible Coupling from the Thomas catalog. Or, he will engineer special variations for unusual cases. For all practical purposes, properly installed and operated within rated conditions, Thomas Flexible Couplings will last *forever*.

NO LUBRICATION • NO MAINTENANCE • THERE ARE NO WEARING PARTS

Under load and misalignment, only Thomas Flexible Couplings offer *all* these advantages:

1. Freedom from backlash—torsional rigidity
2. Free end float
3. Visual inspection while operating
4. Smooth, continuous drive with constant rotational velocity
5. Original balance for life

Write for Engineering Catalog 51A and the name of the Thomas Flexible Coupling engineer nearest you

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

Press Unloaders

Stampings with vertical flanges at their point of pickup can be unloaded with this jaw assembly. It fits conventional straight-line or swinging-arm press unloaders.

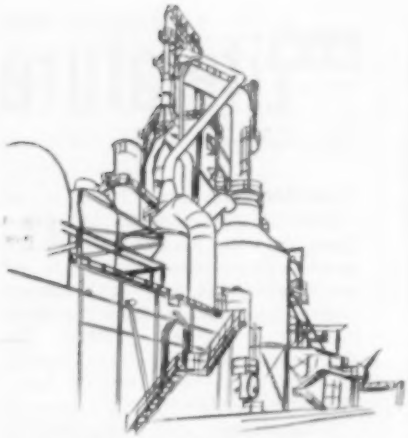
The jaw assemblies are made in two models, both with 1¼-in. jaw openings. Model 715 has a 7-in. stroke and a 1½-in. diameter air cylinder that opens and closes the jaw. Model 820 has an 8-in. stroke

and a cylinder which is 2 in. in diameter. *Write*: Press Automation Systems Inc., 18616 Wyoming Ave., Detroit 21, Mich. *Phone*: University 4-2018

Straddle Fork Lift

This hydraulic hand truck (Model 57) will handle skidded, palletized, strapped and unitized loads.

The straddle legs accommodate pallets or skids with widths from 30 to 48 in. and lengths up to 48 in. *Write*: Langley Mfg. Co., 930 Cambridge St., Cambridge, Mass. *Phone*: Trowbridge 6-9031

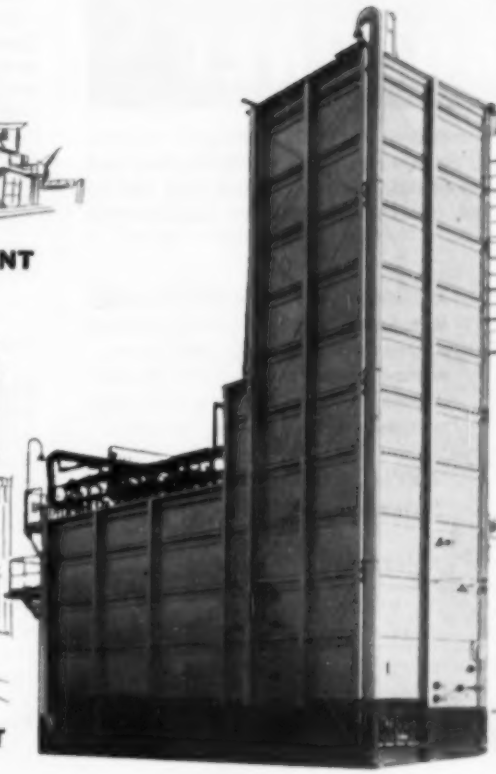


BLAST ENRICHMENT

OXYGEN CONVERTER

SCARFING

FUEL ENRICHMENT



OXYGEN LANCE

ON-LOCATION OXYGEN GENERATORS

are an economic necessity in modern steel-making

Modern steel-making, of course, means "oxygen steel-making". Those steel companies that exploit this new technology to its fullest possibilities are the ones that will pay the biggest dividends.

Fuel enrichment in blast furnace and open hearth, the new oxygen converter, the oxygen lance, scarfing, scrap preparation and—perhaps soon—the desilconizer, all require oxygen in such huge quantities as to make the use of on-location or "captive" generators an economic necessity. Our experience in providing these units for Weirton, Granite City, Jones and Laughlin and other prominent steel companies proves this point.

Air Products will install, on a lease basis without capital investment by you, if desired, an oxygen and/or nitrogen generating station to meet your particular requirements. We design and manufacture:

Large capacity tonnage generators for unlimited quantities of oxygen and nitrogen regardless of size, purity or cycle and "Packaged" High-Purity Generators, producing high-purity oxygen and nitrogen separately or simultaneously.

Ask us to investigate your requirements and provide you with a close estimate of the savings you can expect with your on-location generators.

OUTPUT DEVELOPS EXPERIENCE—**Air Products has built more than 800 successful gas separation plants.**

LOW-COST OXYGEN...NITROGEN

Air Products
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Dept. N, Box 538, Allentown, Pennsylvania

AP

WHY MONARCH lathe head stocks are MICROHONED

Monarch Machine Tool Company Microhones the spindle bores in its lathe head stocks because Microhoning . . . generates consistent finish, size, and alignment of bores . . . corrects out-of-roundness . . . eliminates cost of line-reaming operations . . . permits interchangeability of spindles and bearings.

And with the use of a new three-diameter Microhoning tool, honing time is reduced approximately 40% over former method which employed two double-diameter tools. One set-up now replaces multiple set-ups previously required.

APPLICATION DATA:

STOCK REMOVAL
.003" to .004"

TOLERANCES
diameter..... .0002"
roundness..... .0001"
taper..... .0001"

FINISH....20-25 microinches

PREVIOUS OPERATION
line boring

3 IN-LINE BORE SIZES
4.125" dia. x 1.500" long
5.118" dia. x 1.250" long
6.299" dia. x 5.125" long

Micromatic tooling for Microhoning applications is constantly furnishing manufacturers with cost reductions, higher production and better functional characteristics. A Micromatic Field Engineer will be glad to discuss your production problems and show you "Why" the proper Microhoning tools will help.

The principles and applications of Microhoning are explained in a 30-minute, 16 mm, sound movie, "Progress in Precision" . . . available at your request.

☐ Please send me "Progress in Precision" in time for showing on _____ (date).
☐ Please have a Micromatic Field Engineer call.
☐ Please send Microhoning literature and case histories.

NAME _____
TITLE _____
COMPANY _____
STREET _____
CITY _____ ZONE _____ STATE _____ C

MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN

NEW literature

Write directly to the company for a copy

Transformers

Bulletin GED-2767A, 32 pages, gives data on voltage ratings, frequency, frame size, weight, use and specifications of auto transformers, control panel and machine tool transformers. General Electric Co., Schenectady 5, N. Y.

Armored Cable

Dimensional data on armored cable which handles up to 15,000 volts are given in this 24-page bulletin. Advertising Department, National Electric Products Corp., Gateway Center, Pittsburgh 22, Pa.

Compressors

This 16-page bulletin describes a line of automotive, industrial and portable air compressors. Binks Mfg. Co., 3122 W. Carroll St., Chicago 12, Ill.

Large Nuts

Standard, jam, slotted and lock nuts 2 in. and larger are covered in a 4-page bulletin. Security Locknut Corp., 1800 N. 15th Ave., Melrose Park, Ill.

Press

Bulletin 371, 4 pages, specifies a down-acting press for short production runs. Watson-Stillman Press Division, Farrel-Birmingham Co. Inc., 300 Aldene Rd., Roselle, N. J.

Grinding Wheels

Bulletin GD-56 covers resin and vitrified wheels and their uses. Electro Refractories & Abrasives Corp., 344 Delaware Ave., Buffalo 2, N. Y.

Cutting Tool

Throwaway inserts (made of a molybdenum and titanium alloy) for high velocity machining are introduced in a 4-page bulletin. Newcomer Products Inc., Latrobe, Pa.

Combustion

A special combustion process for heat treating furnaces, drying ovens, soaking pits and forging furnaces is described in this 4-page bulletin. Steel Processing Co., 212 Wood St., Pittsburgh 22, Pa.

Flexible Hose

Catalog G-560, 64 pages, covers specifications, bend diameters, lengths and types of bronze, brass, steel, stainless steel, aluminum, Monel and

plastic hose and tubing. American Metal Hose Division, American Brass Co., 666 S. Main St., Waterbury 20, Conn.

Insulating Refractory

A suspension for walls, arches and nosings of heating and annealing furnaces is described in bulletin 856, 4 pages. Geo. P. Reintjes Co., 2517-19 Jefferson St., Kansas City 8, Mo.

Computers

The rudiments of digital machine computation are presented in this 16-page bulletin. Computer Control Co. Inc., 92 Broad St., Wellesley 57, Mass.

Electric Motors

This 20-page bulletin lists selection data for alternating current squirrel cage motors and gearmotors. Sterling Electric Motors Inc., 5401 Telegraph Rd., Los Angeles 22, Calif.

Industrial Furnaces

This 8-page bulletin, SC-175, describes 27 standard heat treat furnaces. Surface Combustion Corp., Toledo 1, O.

Clutch Catalog

This 76-page engineering manual covers automatic freewheeling clutches, combination clutch-couplings and backstops to prevent reversed runaway of inclined conveyors or vertical elevators. Marland One-Way Clutch Co., 561 Hillgrove Ave., La Grange, Ill.

NEW BOOKS

Metallurgy, (Fourth Edition), Carl G. Johnson and William R. Weeks, American Technical Society, 848 E. 58th St., Chicago 37, Ill. 454 pages, $5.50.

This survey text stresses how physical and chemical properties of metals affect design, shaping, sizing and fabrication.

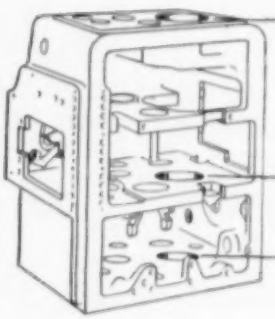
Unified and American External Screw Threads, Reed Rolled Thread Die Co., P. O. Box 350, Worcester 1, Mass. 36 pages, 75 cents.

The book contains general information on straight external and internal threads. It is based on the proposed revision of the American Standard B1.1 draft of 1955. Tables are confined to external threads. Material has been condensed and arranged for the convenience of those who use the thread rolling process.

HOW with one set-up MONARCH MICROHONES three bore diameters

Using a three-diameter tool and only one set-up, Monarch Machine Tool Company Microhones three in-line bores in lathe head stocks. Bore diameters are 4.125", 5.118" and 6.299". Stroke of Microhoning tool is changed only once during the working of all three bores. Former method of honing required multiple tooling and set-up.

How Monarch Microhones:



BORE "C"
6.299" Dia. x 5.125" Long

BORE "B"
5.118" Dia. x 1.250" Long

BORE "A"
4.125" Dia. x 1.50" Long

FIRST STROKE SETTING	Bore "A" is Microhoned while guiding on Bore "B" Bore "B" is Microhoned while guiding on Bore "A"
SECOND STROKE SETTING	Bore "C" is Microhoned while guiding on Bore "B"

How This Microhone Tool Operates:

A compound cone in the tool allows any one of the three bores to be Microhoned by expanding or collapsing individual banks of stones and guides. A selector sleeve shifts the cone rod to provide positive control of abrasives and guides.

Micromatic "How" knowledge, obtained through 27 years of experience in designing, engineering and manufacturing of Microhoning equipment for all types of applications throughout the world, can solve your production honing problems.

Learn how Microhoning will give you efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

☐ Please have a Micromatic Field Engineer call.
☐ Please send Micromatic literature and case histories.

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STREET _____
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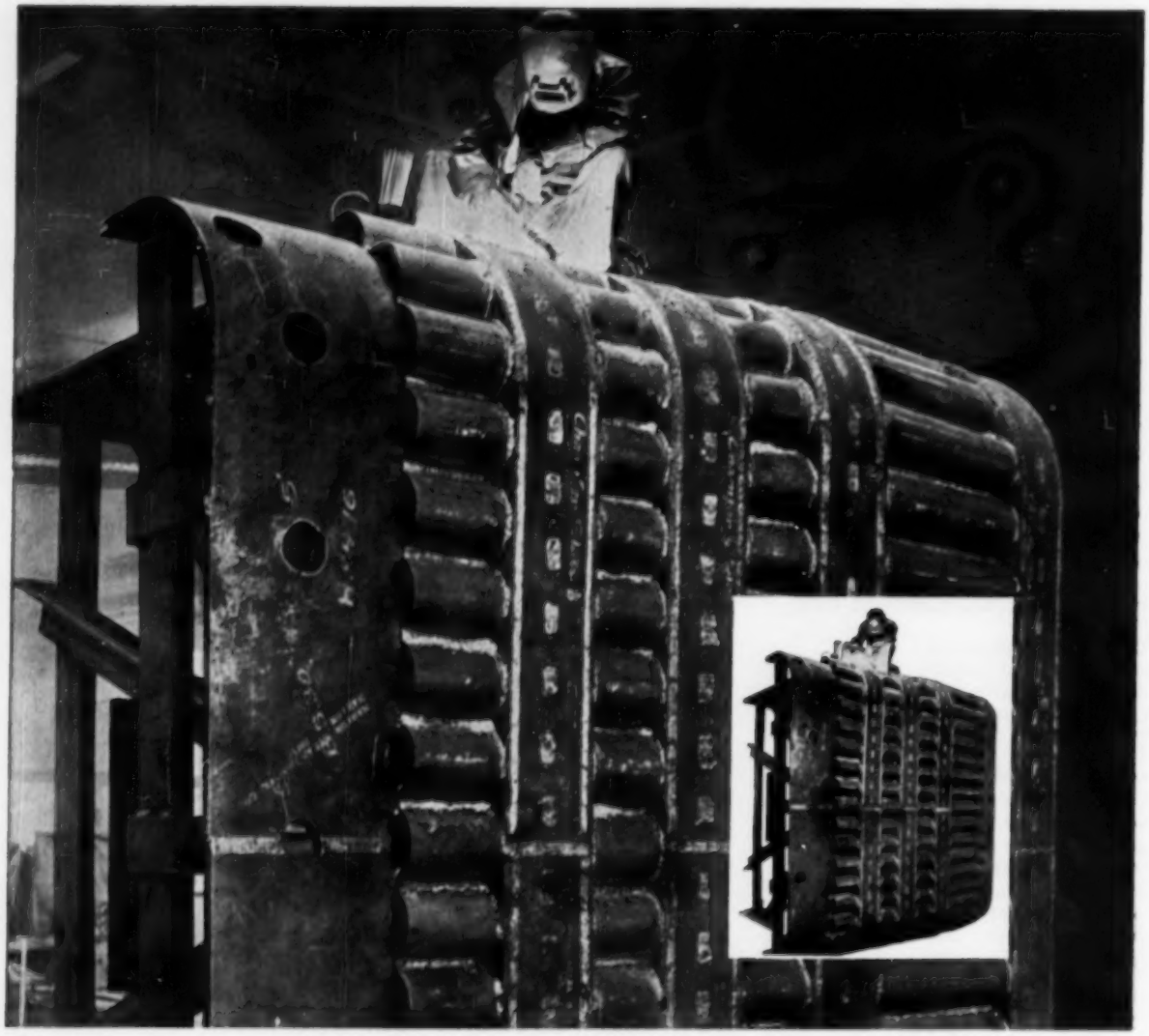
MICROMATIC HONE CORP.
8100 SCHOOLCRAFT AVENUE · DETROIT 38, MICHIGAN



Another huge dipper for a Marion type 5561 stripping shovel—made entirely of Lukens "T-1" steel for extra strength, impact and abrasion resistance—in the shops of Marion Power Shovel Company, Marion, Ohio.

Fabricator of power shovels says:

"LIKE THE WAY TOUGH LUKENS 'T-1' STEEL WELDS AND HANDLES IN THE SHOP"

■ Marion Power Shovel Company's 45 cubic yard stripping shovels now deliver greater payloads with lower maintenance costs and longer service life at the strip mines. Sixty tons of Lukens "T-1" steel in the dipper stick, bail, door, and the dipper itself do the work that once took many extra tons of ordinary steels. And Marion has experienced "no unusual welding problems since switching to this extremely high yield strength metal . . . very satisfied with the way it handles in the shop."

Lukens "T-1" steel is available in the widest range of plate sizes anywhere. Figure it in your new plans.

Our 24-page illustrated booklet, LUKENS "T-1" STEEL, will help show you the way. Write to Manager, Marketing Service, Lukens Steel Company, 846 Lukens Building, Coatesville, Pennsylvania.

Do it now!

LUKENS "T-1" STEEL

TRADE MARK

LUKENS

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS
LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

STEEL

December 17, 1956

Market Outlook

EXCEPT for a slight seasonal sag over the Christmas holidays, steelmaking promises to continue under forced draft right into the new year.

Last week, the national ingot rate advanced 1.5 points to 102 per cent of capacity, equal to a record weekly output of 2,511,000 net tons.

RECORD OUTPUT— Production of 10,566,000 net tons in November set a record for that month. Output for the first 11 months of the year totaled 104,389,104 tons. The November figure compares with 11,048,513 tons in October (the first 11-million-ton month), and with 10,247,398 tons in November, 1955.

The 11-month total is approximately 2 million tons short of production of 106,532,566 tons during the comparable part of 1955, the year of greatest production.

PROSPECTS BRIGHT— The outlook is that production, tonnagewise, will be maintained at a high level into the new year. Percentagewise, the ingot rate may be down somewhat after the turn of the year, reflecting an upward revision in capacity rating.

PRODUCT DEMAND—Currently, plates, structural shapes, reinforcing bars, hot-rolled sheets and pipe are the products in most pressing demand. Cold-rolled sheets are relatively easy, as are bars in certain categories.

There is little prospect for any early easing in these tight supply items (chiefly plates and structurals) with large-volume demand for oil tankers and the road program looming before the market.

TOUGH PROBLEM— The plate supply question is still unanswered. What the government may or may not do to expedite tonnage for oil tanker construction is still anyone's guess. The matter continues to be studied. Firm policy probably won't be announced for another week or ten days.

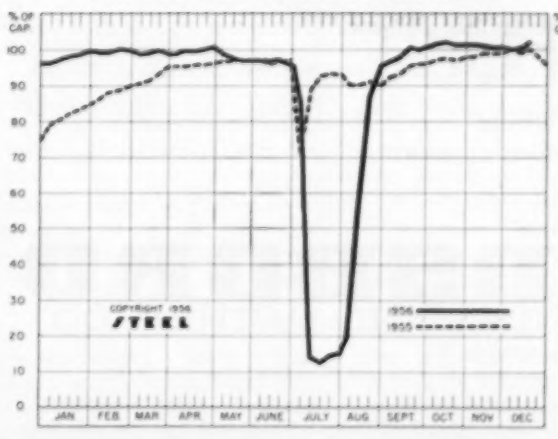
Platemakers hope that a formal priority system will not be established, at least one that might lead to special allocation ratings for railroad car construction, petroleum equipment and other defense-related needs. The mills say they can handle requirements satisfactorily on a voluntary allocation basis.

MORE AUTO BUYING—Auto builders are seeking more hot-rolled sheets than their quotas provide. But they appear satisfied with cold-rolled sheet allotments. Expectations are that if the auto industry runs into steel supply difficulties in the first quarter, it will most likely be in hot-rolled sheets. Some "scare" inquiry for hot-rolled sheets is reported. Efforts to get larger tonnage through conversion arrangements are said to be increasing.

PRICES FIRM— The steel market continues strong with prices steady. STEEL's index on finished steel is unchanged at $137.66. Talk of advances early next year continues. Some observers lean to the view that cost increases will be offset by higher extra charges.

Some of the strength appears to have gone out of the scrap market. In any case, prices slipped last week, notably at Chicago, pulling down STEEL's composite on the steelmaking grades to $65.50, off 67 cents a ton. This is the first reversal in this market since mid-October.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

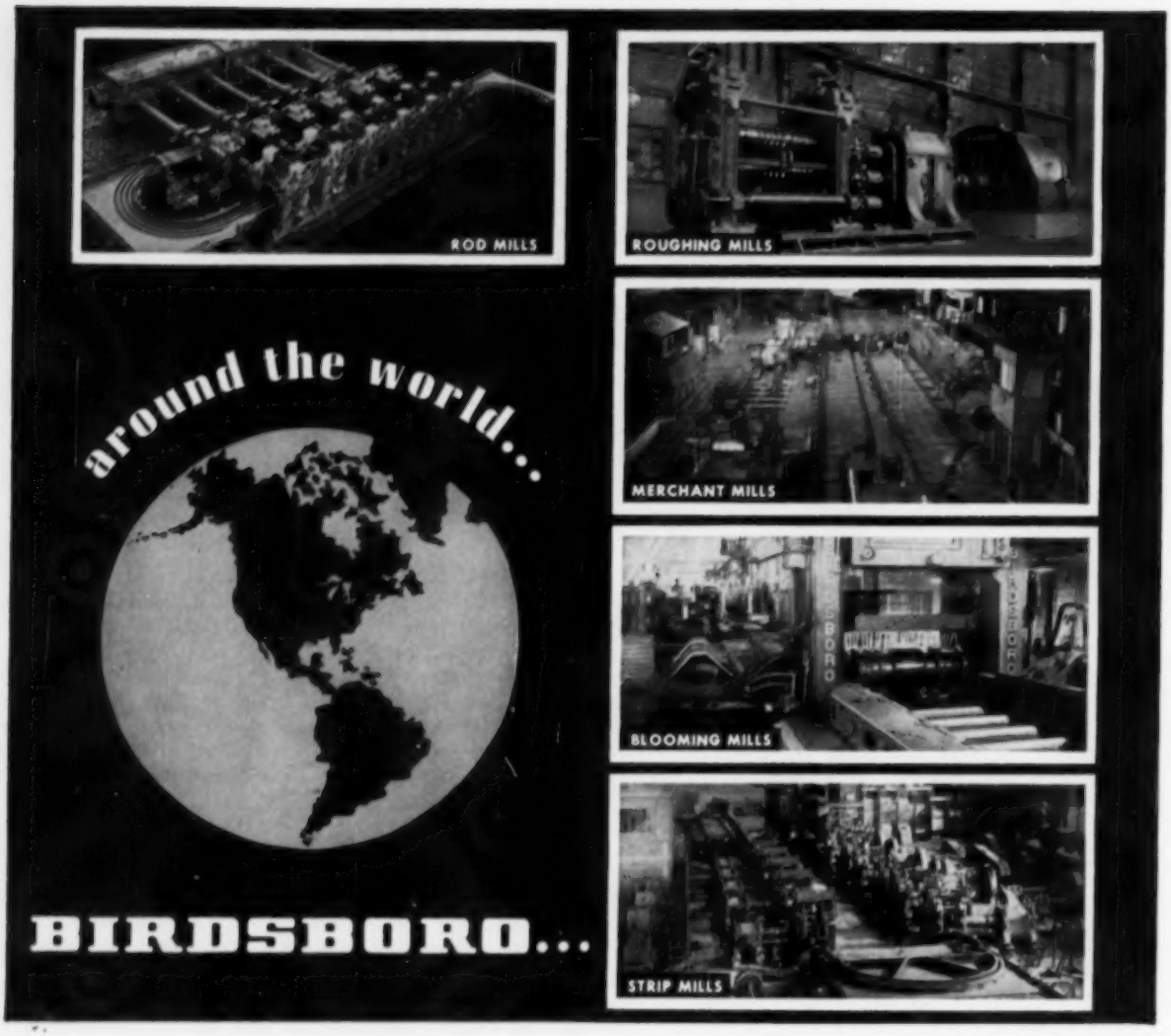
	Week Ended Dec. 16	Change	Same Week 1955	Same Week 1954
Pittsburgh	101	+ 2	102	78.5
Chicago	99.5	+ 1*	99	87.5
Mid-Atlantic	102	+ 1	99	75
Youngstown	104	0	100	87
Wheeling	100	— 2	103	86
Cleveland	107.5	0*	98	95.5
Buffalo	107.5	0	105	100
Birmingham	94	0	94.5	67
New England	70	— 6	89	70
Cincinnati	93.5	+ 1	92.5	71.5
St. Louis	95.5	— 9	107.5	79
Detroit	103.5	+ 4	100.5	75.5
Western	103	0	107	87
National Rate	102	+ 1.5	100	81.5

INGOT PRODUCTION‡

	Week Ended Dec. 16	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	156.3†	155.2	153.5	150.7
NET TONS (In thousands)	2,511†	2,493	2,466	2,421

*Change from preceding week's revised rate. †Est'mated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 47 Technical Outlook—p. 85



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STEEL FOUNDRY AND MACHINE CO.

BIRDSBORO, PA. District Office: Pittsburgh, Pa.
Engineering Subsidiary: Engineering Supervision Co., 120 W. 42nd St., New York 36, N.Y.

STEEL MILL MACHINERY • HYDRAULIC PRESSES (Metalworking and Extrusion) • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

Detroit Steel's salesmen pound doors, uncover sales in . . .

Operation Grassroots

EVER WONDER if your sales force might find some hidden customers by digging a little deeper? Detroit Steel Corp.'s district sales staff in Detroit asked itself that question and came up with "Operation Grassroots."

Dan Mathews, Detroit district sales manager, tells how it happened. "We weren't losing business, but how sure were we that we were not missing any good bets? We decided to find out how thorough our coverage was."

Campaign—In calling on regular accounts, the sales crew had noticed that many smaller metalworking companies had sprung up on the northeast side of Detroit. Mr. Mathews picked out a section about 7 miles deep and several miles long.

He divided this into assigned areas. The six-man staff paired off. Each man on a team took one side of a street. "We knocked on the door of every manufacturing plant in the area," says Mr. Mathews.

Using a prepared survey form, salesmen asked officials what kind of steel or other metals they used and how much. Also noted was the kind of work the company did and whether it was a mill or warehouse steel buyer. Since Detroit Steel is a prime producer of sheets, strip and wire, most attention was paid to companies using such products, with emphasis on cold-rolled strip made at the local mill.

Results — The survey lasted three days. Reports Mr. Mathews: "We made approximately 200 calls and came up with a number of cold-rolled strip and wire prospects. These, of course, are being developed."

None of the calls was on regularly assigned accounts. Salesmen often regard blind calls as costly and time consuming. In addition, survey type sales calls can irritate prospective customers.

Tactful—Dan Mathews says: "Surveying is a common thing, but it takes tact. Companies don't like to be bothered."

Added Mr. Mathews: "We were careful to explain what we were doing and why. A few companies didn't want to talk with us, but most outfits seemed to be pleased that anyone would take time to call on them." More than one survey form lists remarks like this: "I wish our salesmen would get out and do this kind of job!"

Booster—Mr. Mathews asserts: " 'Operation Grassroots' was well worth the time. We not only got some accounts, but our morale shot way up. We showed ourselves there's more to selling than checking regular accounts. It also proved to management that salesmen are willing to get out and beat the bushes."

The plan has been so successful that Detroit Steel is running similar projects in other districts. And the Detroit office has moved ahead with another idea. Mr. Mathews explains his staff has developed a prospect list from manufacturers' directories.

"We're setting up lists for each major city in our territory," he says. The sales-survey technique will be used. A preliminary survey in Michigan has turned up some hot prospects already.

Modest — Is "Operation Grassroots" unusual? Mr. Mathews says no, although it's not common for a steel producer to do it. "We just wanted to prove to ourselves we were doing the best job possible." Applying a survey technique to selling steel proves his point.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 122 & 123

Armco Steel Corp., Middletown, O., last week announced changes in its list of extras for some of its sheet steel products. Some of the dimensional extras for hot-rolled, cold-rolled and cold-rolled paintgrip were increased, while most of the dimensional extras for the enameling iron were reduced.

On hot-rolled, cold-rolled, cold-rolled paintgrip and on all carbon coated sheets, changes have been made in certain quality and chemistry extras, including an increase in the extra for drawing quality-special killed steel. Other changes include an increase in the pickling extra for some of the sizes of hot-rolled sheets.

The revised list of extras is more in line with costs, the company says. It is estimated the overall effect of the changes is an increase of less than 3 per cent. The new extras became effective with shipments Dec. 13.

Although demand for hot-rolled sheets continues much stronger than that for cold rolled, inquiry for cold rolled is reported improving, notably from the auto industry.

Most of the mills anticipate they will have specifications for all the cold-rolled sheets they can produce in the first quarter.

Sheets are moving to the auto plants at a good clip, but there is nothing rushing or urgent about

auto demands. The auto builders apparently are not building cold-rolled inventories. Several mills still have cold-rolled tonnage open for January shipment. Appliance demand is not pressing.

Hot-rolled sheets are running at least one month behind on deliveries. A few mills are rolling light plates on strip mills, and this is tightening hot-rolled sheet supply.

Alan Wood Steel Co., Conshohocken, Pa., expects to have additional cold-rolling facilities in operation by early February. Its capacity is being increased to 15,000 tons monthly.

Stainless Steel . . .

Stainless Steel Prices, Page 135

Allegheny Ludlum Steel Corp. last week increased its base prices on nickel-bearing stainless steel grades. The higher prices reflect increased cost of nickel and other raw materials. Increases on the most common grades range from 1.75 cents to 6 cents a pound. The new prices became effective Dec. 12.

Sales of plates to industrial equipment producers continue to feature the stainless steel market. Producers say demand is heavy for bars and plates through the first quarter. Cold-rolled strip sales have been slow due to lack of demand from auto makers.

Tool Steel . . .

Tool Steel Prices, Page 135

Shipments of high speed and tool steel (exclusive of hollow drill steel) totaled 10,790 net tons in October, reports the American Iron & Steel Institute. This compares with 9,426 tons in September and 10,095 in October a year ago.

Total movement in the ten months ended October was 107,305 tons. This compares with 93,137 in the like period of 1955.

Plates . . .

Plate Prices, Page 131

What Washington may do to expedite plate shipments for tanker construction and repairs remains the big question in the market. Producers are honing no formal priority system will be established. They think it might lead to special ratings for car construction, petroleum equipment and other so-called defense-related needs.

The mills are confident they will be able to handle requirements satisfactorily on a voluntary basis, once over-all needs are definitely determined.

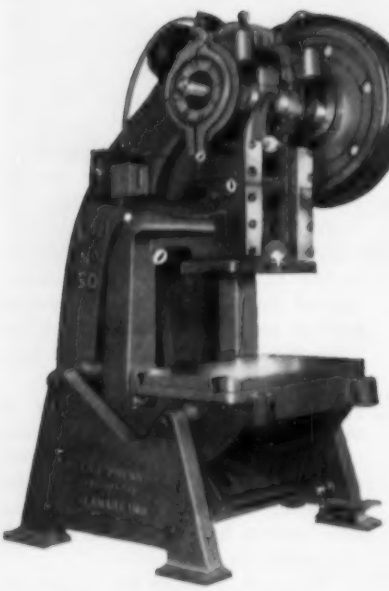
The immediate outlook is for continued scarcity. A few mills are rolling light plates on strip mills, providing some relief in the tight supply situation. Shipments of the strip-plates are about two weeks behind schedule. Plates requiring heat-treating and all heavy plates are one to two months behind schedule. Some users fear orders for heavy plates for March may have to be canceled.

A large Pittsburgh area plate user says it will be forced to depend partially on conversion tonnage and foreign steel in the first half of next year. It had been able to fill all its 1956 needs from regular supply sources.

An oil refinery for the Commerce Oil Refining Co., Portsmouth, R. I., to be completed in 1958, will take

L&J 50 SERIES

EXTRA CAPACITY WITH PRECISION TO MATCH



Large area dies are no problem when you have an L&J No. 50 Series press with its extra capacity. The exceptionally heavy frame provides maximum rigidity which enables the flanged, box-type ram to maintain precision alignment for precision jobs. The large work area will permit you to run a greater variety of work. Its dependability and tooling ease provide a new high in press efficiency.

Available in geared and non-geared models. Air clutch is available. It will pay you to get complete details now.

SPECIFICATIONS

Capacity: *Model 50*—50 tons, *Model 50B*—56 tons. **Shut Height:** 10" to 25". **Ram Stroke:** 3" to 8". **Ram Adjustment:** 3". **Ram Face:** 24" x 12". **Bolster Plate:** 36" x 24" x 2¼". **Throat Depth:** 12½". **Opening Thru Back:** 22". **Speed:** *Model 50* Non-geared—100 S.P.M., Geared—50 S.P.M. *Model 50B* Non-geared—95 S.P.M. Geared—46 S.P.M. *Higher speeds with air clutch.*

Write for Bulletin L-14

Describes L&J O.B.I. Presses. 23 Models, 14 to 90 tons, geared and non-geared. Also, 20 to 50 ton Double Crank, High Speed, Straight Side Presses.

L&J PRESS CORPORATION
1628 STERLING AVENUE, ELKHART, INDIANA

an estimated 15,000 tons of plates, including steel for tank storage facilities.

Steel Bars . . .

Bar Prices, Page 131

Hot-rolled carbon bar specifications are increasing. Most producers look for a full order book in the first quarter, with a spurt in automotive requirements expected to be an important contributing factor. Most emphasis is still on large rounds and flats.

Order books for late first quarter shipment are reported filling at Pittsburgh, especially in the large hot-rolled sizes affected by demand from the construction industry.

The auto builders are taking all the bars set aside for them in February and March, but they are not pressing the market for tonnage.

Suppliers of cold-drawn bars report sales continue slack, and some of them don't expect much change next month.

Tubular Goods . . .

Tubular Goods Prices, Page 135

Except for a seasonal slowing down in sales of buttweld pipe to the construction industry, most tubular goods are in strong demand. Producers report a pickup in automotive requirements for mechanical tubing. Pressure tubing is in strong demand.

Line pipe output is committed well into 1959 at the principal producing plants. Makers of oil country tubing will begin to take second quarter orders next month. They will give out quotas to customers.

Export demand is increasing along with that on domestic account.

Warehouse . . .

Warehouse Prices, Page 136

The volume of business booked by distributors continues good and is expected to be larger than usual for December. Substantial tonnages are being diverted to warehouses from mills which are unable to satisfy their customers' needs fully.

Distributors of flat-rolled products expect to enter the first quarter with no serious shortages. Hot-rolled sheet producers are booked solidly for that period, but distributors have obtained enough to meet demand. Galvanized, silicon and cold-finished sheets are still in ample supply.

A seasonal slowdown in demand has developed for buttweld pipe and wire. Consumers of several other products, including bars, have trimmed their December buying, transferring orders to January in numerous instances to avoid carrying large inventories at year end.

Tin Plate . . .

Tin Plate Prices, Page 133

Shipments of metal cans during the first 10 months this year totaled 4,253,364 tons, comparing with 3,960,590 in the like 1955 period, according to the Census Bureau. The October movement was 516,542 tons, comparing with 533,264 in September, and 501,431 in October a year ago.

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ERIE Bolts • Studs • Cap Screws • Nuts

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Your most exacting specifications take precision form in the hands of our expert craftsmen. Bolts—Studs—Cap Screws—Nuts as specified to resist corrosion, extreme temperatures and tensile stresses are the product of more than 40 years continuous production of highest quality fasteners for a wide diversity of industries.
Send us your specifications for prompt estimate.

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Looking for the world's most complete stock of 52100 steel tubes and bars? You've come to the right spot . . . . . .

PETERSON STEELS, INC.
Union, New Jersey
Detroit, Michigan Chicago, Illinois

Wire . . .

Wire Prices, Pages 133 & 134

Forward buying of carbon steel wire is light. Orders for January-February are trickling in, but uncertainty as to automotive requirements through the first quarter is retarding anticipatory buying.

Screw and spring grades are slower than had been expected, but until this quarter, the impact of the automotive lag has been minimized.

Carbon rod volume in the smaller sizes, nonspecialty grades, is down.

Effective with shipments Dec. 3, Atlantic Steel Co., Atlanta, adopted order quantity extras on merchant wire products. Amended commodity groups are: Nails and staples; merchant quality wire and hogshead wire; barbed and twisted barless wire; field and poultry fence; single loop bale ties; wire for automatic balers.

Gates, lawn fence, posts and poultry netting are not affected by the quantity plan, but the weight of these, included in a shipment, may be combined with the named quantity groups in applying order quantity extras. Other wire products made or stocked by the company may be included in shipments with merchant wire products. The weight of these "other" products may not be combined with merchant wire products to determine order quantity extras.

The three quantity extra groups, on merchant wire products only, are:

ORDER QUANTITY EXTRAS (on combined weight of permissible items)

Pounds	—Per 100 lb— Dollars	Cnts.
40,000 and over	Base	..
30,000 to 39,999, Incl.	0.10	2
20,000 to 29,999, Incl.	0.20	4
Under 20,000 lb	1.25	25

COMMODITY GROUP EXTRAS (applicable to each commodity group listed above)

20,000 and over	Base	..
10,000 to 19,999, Incl.	0.10	2
6000 to 9999, Incl.	0.20	4
2000 to 5999, Incl.	0.30	6
Under 2000	0.50	10

ITEM EXTRAS (applicable to each individual item of merchant wire products)

1000 and over	Base	..
500 to 999, Incl.	0.25	5
Over 500	0.50	10

October Steel Shipments Big

Shipments of finished steel in October amounted to 7,930,957 net tons, reports the American Iron & Steel Institute. This was the third

highest monthly tonnage on record, and compares with 7,216,821 tons in November, 1955.

For the first ten months this year shipments amounted to 68,755,943 tons. This is only 1.6 per cent below the ten-month total for 1955 despite the strike loss.

Structural Shapes . . .

Structural Shape Prices, Page 131

Structural steel bookings of 290,961 tons in October were slightly above those of the preceding month, but they were 6 per cent below awards in the like month a year ago, reports the American Institute of Steel Construction. Bookings for the first ten months were up 10 per cent—3,269,865 tons, against 2,982,404.

Shipments were higher all around. The October movement totaled 287,639 tons, against 240,858 in September, and 283,768 in October a year ago. Shipments for the first ten months were higher at 2,631,658 tons, against 2,475,357 in the like 1955 period.

Backlogs of 3,215,486 tons as of Oct. 31, showed a substantial rise. Of this total, 1,238,861 tons were scheduled for fabrication through February.

Considerable structural inquiry is active, including large office buildings and bridge work in the East. Sixty-six thousand tons are involved in two New York office buildings alone, and other important, though less sizable projects, are being figured. Bridge work in the area is featured by approximately 9500 tons for nine New York state projects, on which bids will be opened Dec. 20.

Illinois will conduct a record-breaking $220-million road building program in 1957.

Pig Iron . . .

Pig Iron Prices, Page 136

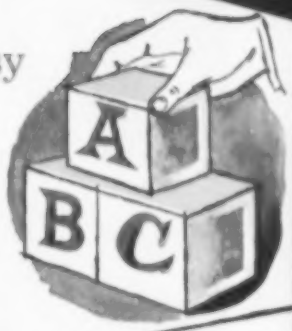
Automotive foundries are stepping up their casting operations in line with the quickening pace of new model auto assemblies. Farm implement foundries will accelerate their activity soon.

As a result, pig iron orders are increasing. An additional bulge in buying is resulting from the increasingly large proportion of pig iron in melts.

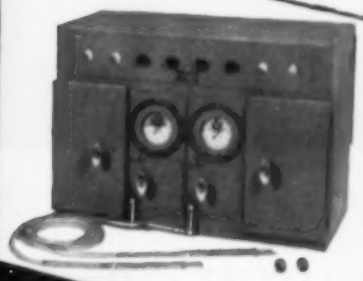
In the Buffalo district, orders

It's almost THIS easy

. . . to set up
AUTOMATION GAGING*
with
PRATT & WHITNEY
PACKAGE
UNITS



any number
of basic units
can be
assembled
as required



* **Automation Gaging . . .** uses a "feed-back" control system to re-set the machine as required to maintain work tolerances AUTOMATICALLY at all times. The results are: increased production, greater accuracy, fewer rejects . . . and greater profits!

AND NOW . . . an Automation Gaging installation . . . custom tailored to your exact needs . . . can be assembled quickly and easily from standard, in-stock Pratt & Whitney Package Units. The big expense and long delays of specially constructed control equipment are eliminated.

LEARN HOW practical the advantages of Automation Gaging can be applied to your production lines. Phone the nearby P&W Branch Office and ask a Pratt & Whitney Gage Specialist to call at your plant . . . or write direct to West Hartford outlining your requirements.

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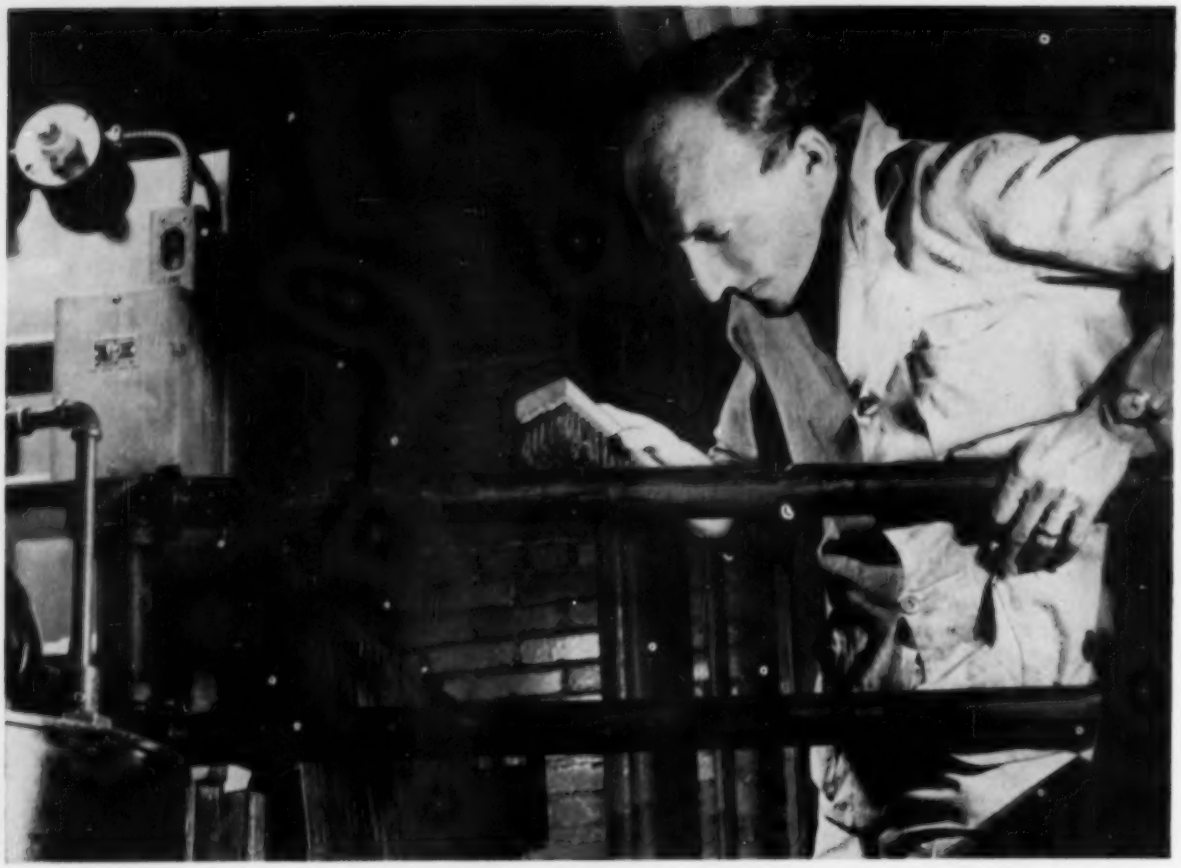

Do heating coils in your vapor degreaser often get gummed up like this? You may be using a degreasing solvent that's poorly stabilized. Read below how you can minimize this coil-cleaning job, and degrease more parts between cleanouts.

Why Nialk® TRICHLORethylene with **psp** gives you **more degreasing, less downtime**

Cut your degreasing costs with this permanently stabilized solvent

It's the *stabilizer* in the trichlorethylene that determines how long you can use it safely and efficiently.

Light, heat, air, acids, and active metals such as aluminum, given time, can break down improperly stabilized trichlorethylene, making it unfit for further degreasing.

Only Nialk TRICHLORethylene has psp

The stabilizer in NIALK TRICHLORethylene has **psp**—permanent STAYING power. It's neutral, non-alkaline. You *never* have to replenish it.

Only NIALK has this *permanent staying power*. Even after repeated distillations, its unique stabilizer prevents acid formation and other causes of breakdown.

NIALK works equally well with *all* metals.

psp means cheaper degreasing—here's why

You don't have to clean out your degreaser nearly so often with NIALK TRICHLORethylene. You can degrease many more parts between cleanouts.

The NIALK stabilizer actively retards formation of degradation products in your degreaser. Cleanouts are easier, faster.

Get proof of Nialk's cheaper, safer cleaning

See for yourself how NIALK TRICHLORethylene with **psp** stays stable, keeps cleaning efficiently long after other solvents have lost their punch. Write on your business letterhead for a revealing resumé of comparative metallurgical tests on five leading brands.

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HOOKER ELECTROCHEMICAL COMPANY

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Manufacturers of VIRGO® DESCALING SALT, VIRGO ELECTROLYTIC SALT, VIRGO MOLTEN CLEANER

for castings are not keeping abreast of the high activity in other phases of metalworking. A few foundries are working less than five days a week because of the lack of business. Price competition from southern foundries continues to plague foundry operations in that district.

Melters on the West Coast complain they are paying as much as $62 for No. 1 cupola cast, but are getting inferior grades. One foundry operator claims he would be willing to pay $65 to $66 if he could obtain top quality foundry scrap.

Steel Record Set in November

Steel production totaled 10,566,000 net tons in November, a record for that month. It brought output for the first 11 months of the year to 104,389,104 tons, reports the American Iron & Steel Institute.

The November total compares with a revised October figure of 11,048,513 tons. October was the first 11-million-ton month in history. A year ago, November production amounted to 10,247,398 tons.

The 11-month total is approximately 2 million tons short of the production of 106,532,566 tons in the like period of 1955, the year of greatest steel output.

During November, the furnaces operated at 100.1 per cent of capacity. This compares with 101.3 in October. The average for the 11 months was 88.6 per cent.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4000 tons, superstructure, international high level bridge, South Cornwall Island channel, St. Lawrence Seaway, to American Bridge Division, U.S. Steel Corp., Pittsburgh, at $4,759,045, low, direct to the Corps of Engineers, Buffalo.

2740 tons, including 865 tons low alloy, 16 span, 1263-ft bridge, Byram river, New York thruway, New England connection with Connecticut turnpike, Greenwich, Conn.-Port Chester, N. Y., to Harris Structural Steel Co., New York; Poirier & McLane Corp., New York, general contractor.

1040 tons, shop and laboratory buildings, Redstone Arsenal, Ala., to Decatur Iron & Steel Co., Decatur Ala.; J. A. Jones Construction Co., Atlanta, Ga., is general contractor.

700 tons, also unstated reinforcing, service facility and center for Washington Water Power Co., Spokane, Wash., to Union Iron Works, Spokane; general contract to Johnson-Busboom & Rauh, at $2,228,669.

625 tons, Oregon state Yamhill river bridge, to Isaacson Iron Works, Seattle; Manson Construction & Engineering Co., Seattle, general contractor.

500 tons, Maynard station, Waterloo, Iowa,

Steel Ingot Production—November, 1956

Period	—OPEN HEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cent of capacity
1956								
January ..	9,676,181	101.4	323,235	79.5	828,845	86.7	10,828,331	99.3
February .	9,063,064	101.3	296,543	78.0	779,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,462	85.7	10,934,785	100.2
1st Qtr. ..	28,514,473	101.8	929,838	77.9	2,427,695	86.5	21,872,014	99.6
April	9,437,945	102.2	306,358	77.9	779,452	84.2	10,523,755	99.7
May	9,370,167	98.2	297,990	73.3	822,219	84.0	10,490,376	94.2
June	8,665,044	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
2nd Qtr. ..	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
1st 6 Mo..	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
July	1,330,151	13.9	.....	...	292,013	30.8	1,622,163	14.9
August ...	7,213,274	75.6	189,564	46.6	719,750	75.3	8,122,587	74.8
September..	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
3rd Qtr. .	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
9 Mo. ...	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
*October...	9,841,002	103.2	330,101	81.2	877,410	91.8	11,048,513	101.3
†November .	9,440,000	102.3	296,000	75.2	830,000	89.7	10,566,000	100.1
1955								
January ..	8,054,345	86.0	199,229	49.0	584,162	63.6	8,837,736	82.7
February .	7,734,884	91.5	197,091	53.7	564,959	68.1	8,496,934	88.0
March	9,060,026	96.7	255,493	62.8	666,235	72.6	9,981,754	93.4
1st Qtr. ..	24,849,255	91.4	651,813	55.2	1,815,356	68.1	27,316,424	88.0
April	8,858,549	97.7	275,069	69.8	681,477	76.6	9,815,095	94.8
May	9,307,291	99.4	266,347	78.1	715,678	77.9	10,328,316	96.6
June	8,764,430	96.6	283,544	72.0	698,493	78.6	9,746,467	94.1
2nd Qtr. ..	26,930,270	97.9	863,960	72.3	2,095,648	77.7	29,889,878	95.2
1st 6 Mo..	51,779,525	94.7	1,515,773	63.8	3,911,004	72.9	57,206,302	91.6
July	8,232,535	88.1	268,348	66.1	600,063	65.5	9,100,946	85.3
August ...	8,600,612	91.8	298,973	73.5	694,961	75.7	9,594,545	89.7
September .	8,829,266	97.6	307,171	78.2	745,888	84.1	9,882,325	95.7
3rd Qtr. ..	25,662,413	92.4	874,491	72.6	2,040,912	75.0	28,577,816	90.2
9 Mo.	77,441,938	93.9	2,390,264	66.8	5,951,916	73.6	85,784,118	91.1
October ...	9,369,704	100.0	330,150	81.2	801,196	87.3	10,501,050	98.2
November .	9,141,244	100.8	306,674	77.9	799,480	89.9	10,247,398	99.0
December .	9,406,531	100.7	292,429	72.1	804,559	87.8	10,503,519	98.5
4th Qtr. ..	27,917,479	100.5	929,253	77.0	2,405,235	88.3	31,251,967	98.6
Last Half .	53,579,892	96.5	1,803,744	74.8	4,446,147	81.7	59,829,783	94.4
Total 1955	105,359,417	96.6	3,319,517	69.3	8,357,151	77.3	117,036,085	93.0

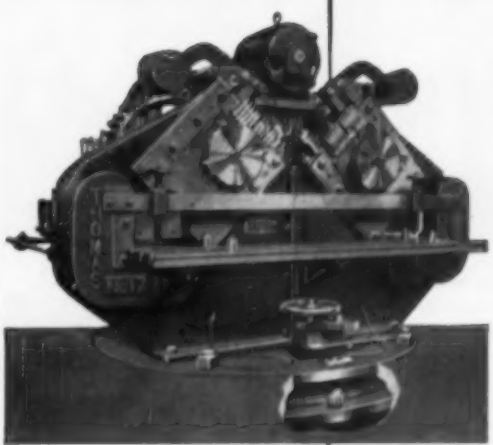
Note—The percentages of capacity operated are calculated on weekly capacities in 1956 of 2,184,144 net tons open hearth, 91,810 net tons bessemer and 215,939 net tons electric ingots and steel for castings, total 2,461,893 net tons; based on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

*Revised. †Preliminary figures subject to revision.

the trend is to THOMAS

double angle shears



The inbuilt quality and ruggedness of Thomas double angle shears insure years of trouble free service with a minimum of maintenance.

If you have a need for "high production" shearing of angles it will pay you to investigate Thomas.

Sizes are built for angles up to 8x8x1⅛", with or without turn-table.

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Punches • Shears • Presses
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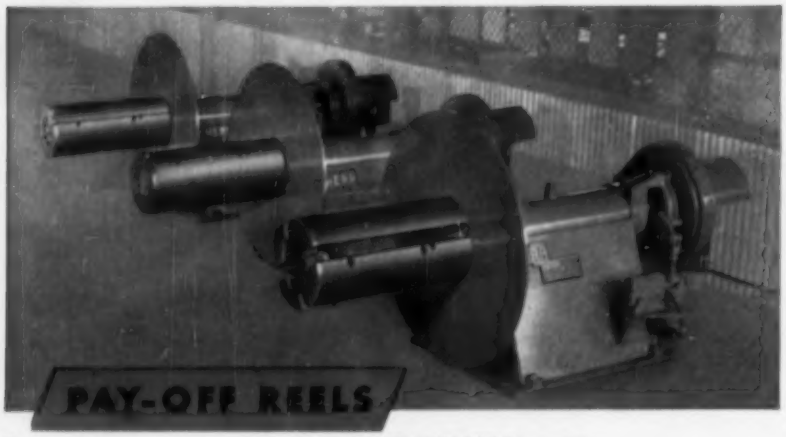
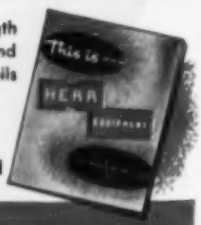
HERR EQUIPMENT

"Complete Processing and Handling Equipment . . . for any Ferrous or Non-Ferrous Material . . . That Starts — or Ends — as a Coil"



Types and sizes for coils weighing from 5,000 to 30,000 lbs. and up to 84" wide. Fixed, adjustable or automatically aligning bases. Timken bearings. Can be equipped with threading drive, also automatic speed compensating drive for feeding presses.

Fast acting single shears for use with hump tables in cut-to-length and press feed lines, and other applications to square crop the end of a coil. Also twin cut shears that remove the section where two coils were stitched or welded together for continuous processing.



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CLEVELAND, INDIANAPOLIS AND BERKELEY, CALIFORNIA

for the Iowa Public Service Co., through Ebasco Services, New York, to the Gate City Steel Works Inc., Omaha, Nebr.

410 tons, second phase of the Eagle Gorge project near Seattle, to United Concrete Pipe Co., Auburn, Wash.; Slate, Hall, Hamilton, Portland, Oreg., general contractor.

300 tons, buildings, Topsham, Me., AFB, to Hussey Mfg. Co., North Berwick, Me.; Consolidated Constructors Inc., Portland, Me., general contractor.

220 tons, boiler supports, awarded through Combustion Engineering Co. to the Simon Holland & Son Inc., Brooklyn, N. Y.; 150 tons are for a project at St. Marks, Fla., and 80 tons for another at Millikin, N. Y.

380 tons, hatch covers, Barnhart Island power plant, St. Lawrence Seaway, to Seaboard Structural Steel Division, A. S. Wikstrom Inc., Wilmington, Del.

170 tons, reconstruction, Massachusetts avenue bridge over the New Haven Railroad, Boston, to Builders Iron Works, Somerville, Mass.

STRUCTURAL STEEL PENDING

9493 tons, nine New York state bridge projects, bids Dec. 20; list comprises two projects in Westchester county involving 4612 tons and 410 tons; two in Erie county, involving 835 tons and 290 tons; one in Albany county, 702 tons; one in Rensselaer county, 671 tons; one in Livingston county, 329 tons; one in Columbia county, 1095 tons; and one in Nassau county, 559 tons.

7000 tons, state bridge, Section 3-D, Allegheny county, Pa.; American Bridge Division, U.S. Steel Corp., Pittsburgh, low.

5200 tons, state bridge, section 11, Allegheny county, Pa.; Ft. Pitt Bridge Works, Pittsburgh, low.

4000 tons, 12 taintor gates and other equipment, Rocky Reach dam, Columbia river; Consolidated Western Steel Corp., Seattle, apparently low at $2,716,500 to Chelan county P.U.D., No. 1.

9500 tons, steel sheet piling, Barkley dam, Cumberland river, Kentucky; no bids received, Corps of Engineers.

760 tons, including 425 tons tunnel supports, power plant, Missouri Basin project, near Casper, Wyoming; bids Jan. 3, Bureau of Reclamation, Denver.

825 tons, relocation span, third phase Eagle Gorge project; bids to be out about Jan. 10 by U.S. Engineer, Seattle; opening March 12.

550 tons, state bridge work, Berks county, Pa.; Robert Blazeley, Pottsville, Pa., is low.

300 tons, river span, Boeing Airplane Co., Seattle; bids called early January; Worthington & Skilling, Seattle, engineer.

250 tons, Helena Valley pumping plant, Canyon Ferry, Mont.; Misco West Coast, Seattle, low at $830,285 to the Bureau of Reclamation.

195 tons, state highway bridge, East Lyme, Conn.; bids Dec. 17, Hartford, Conn.; also 95 tons, steel piles, and 55 tons, reinforcing bars.

REINFORCING BARS . . .

REINFORCING BARS PLACED

715 tons, Oregon state bridge near Newburg, to Soule Steel Co., Portland, Oreg.; Manson Construction & Engineering Co., Seattle, general contractor.

560 tons, shop and laboratory buildings, Redstone Arsenal, Ala., to Ceco Steel Products Co., Birmingham; J. A. Jones Construction Co., Atlanta, Ga., is general contractor.

275 tons, garage, Philadelphia Gas Works, Philadelphia, through Charles Fleming, general contractor, to American Steel Engineering Co., Philadelphia.

145 tons, second phase Eagle Gorge project, near Seattle, to Soule Steel Co., Portland, Oreg.; Slate, Hall, Hamilton, Portland, Oreg., general contractor.

REINFORCING BARS PENDING

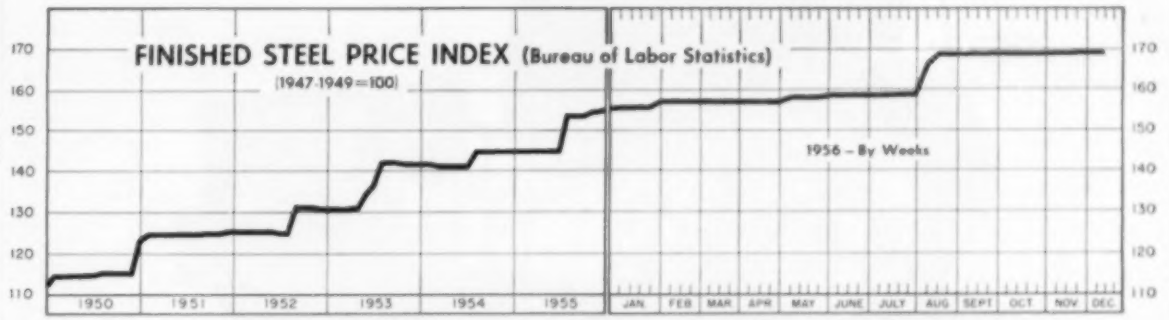
335 tons, Helena Valley pumping plant, Canyon Ferry, Mont.; general bids in to the Bureau of Reclamation.

PLATES . . .

PLATES PLACED

400 tons, tanks, Heubiein Inc., Muscatine, Iowa, to the Graver Tank & Mfg. Co., Chicago.

Price Indexes and Composites



Dec. 11 1956	Week Ago	Month Ago	Nov. Avg.	Year Ago
168.8	168.8	168.8	168.8	154.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 11

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.150	Bars, Reinforcing	5.735
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.810
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	8.950	Bars, C.F., Stainless, 302 (lb)	0.508
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.695
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.229
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H. R., Alloy, High Speed, W, 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	5.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.580
		Casing, Oil Well, Carbon (100 ft)	178.646
		Casing, Oil Well, Alloy (100 ft)	276.870
Tubes, Boiler (100 ft)	45.033	Black Plate, Canmaking Quality	7.233
Tubing, Mechanical, Carbon (100 ft)	22.973	Wire, Drawn, Carbon	9.175
Tubing, Mechanical, Stainless, 304 (100 ft)	187.133	Wire, Drawn, Stainless, 430 (lb)	0.450
Tin Plate, Hot-dipped, 1.25 lb	9.433	Bale Ties (bundle)	7.213
Tin Plate, Electrolytic, 0.25 lb	8.133	Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	5.412
		Woven Wire Fence (20-rod roll)	36.505

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 12 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.92	225.92	225.92	206.90	171.92
Index in cents per lb	6.111	6.111	6.111	5.569	4.487

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$137.66	$137.66	$137.66	$128.14	$106.22
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.64
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.14
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	65.50	66.17	61.50	50.17	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 84; of arithmetical price composite, STEEL, Sept. 1, 1953, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 12 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.35	5.35	5.35	4.90	4.323
Bars, C.F., Pittsburgh	6.55*	6.55*	6.55*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.40	5.40	5.40	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.25	5.25	5.25	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.225	3.69-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.225	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-6.85	5.325-5.425	4.50
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.225	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.225	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.20	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{1}{2}$" Pitts.	5.80	5.80	5.80	5.025	4.10-4.20

PIG IRON, Gross Ton	Dec. 12 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld, Phila.	66.26	66.26	66.26	62.16	56.01
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	49.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	56.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	235.00†	235.00†	235.00†	190.00†	188.00*

†74-76% Mn, net ton. *76-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$66.50	$66.50	$62.50	$50.00	$44.00
No. 1 Heavy Melt, E. Pa.	63.00	63.00	59.00	50.00	42.50
No. 1 Heavy Melt, Chicago	67.00	69.00	63.00	50.50	42.50
No. 1 Heavy Melt, Valley	66.50	66.50	66.50	52.50	44.00
No. 1 Heavy Melt, Cleve.	65.00	65.00	65.00	50.50	43.00
No. 1 Heavy Melt, Buffalo	62.50	60.50	59.50	45.50	43.00
Rails, Rerolling, Chicago	93.50	89.00	87.50	73.50	52.50
No. 1 Cast, Chicago	50.50	50.50	50.50	50.50	49.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$14.50	$14.50	$14.50	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50

Vintage 1899 LOCOMOBILE

GETS NEW LIFE WITH STAINLESS STEEL TUBES

• The owner of this pioneer steam-propelled "horseless carriage" selected Carpenter Stainless Tubing, Type 304, to re-tube the heat exchanger in his valuable 1899 Locomobile Steamer. The exchanger, shown being lowered into place, contains 308 tubes ½" dia. x 13 7/16" long. Previous carbon steel tubes lasted only 3 years, and required annual cleaning which is now eliminated. Possibly you can prolong equipment life in *your* plant by switching to Carpenter Stainless Steel Tubing or Pipe.

MEMBER

The Carpenter Steel Company
Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.*
Code numbers following mill points indicate producing company. Key to producers, page 132; to footnotes, page 134.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$70.50

INGOTS, Alloy (NT)
Detroit R7 ....$74.00
Houston S5 ....74.00
Midland,Pa. C18 ....74.00
Munhall,Pa. U5 ....74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)
Aliquippa,Pa. J5 ....$74.00
Bessemer,Pa. U5 ....74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 ....74.00
Clairton,Pa. U5 ....74.00
Ensley,Ala. T2 ....74.00
Fairfield,Ala. T2 ....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 ....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ....80.00
Munhall,Pa. U5 ....74.00
Pittsburgh J5 ....74.00
S.Chicago,Ill. R2, U5 ..74.00
S.Duquesne,Pa. U5 ....74.00
Sterling,Ill. N15 ....74.00
Youngstown R2 ....74.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$91.50
Bessemer,Pa. U5 ....91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 ....91.50
Canton,O. R2 ....94.00
Clairton,Pa. U5 ....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 ....91.50
Fairfield,Ala. T2 ....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 ....91.50
Geneva,Utah C11 ....91.50
Houston S5 ....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 ....101.00
Midland,Pa. C18 ....91.50
Munhall,Pa. U5 ....91.50
Pittsburgh J5 ....91.50
Seattle B3 ....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ....101.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$107.00
Bridgeport,Conn. N19 ..107.00
Buffalo R2 ....107.00
Canton,O. R2 ....107.00
Conshohocken,Pa. A3 ..114.00
Detroit R7 ....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 ....107.00
Houston S5 ....112.00
Ind.Harbor,Ind. Y1 ....107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2 ..107.00
LosAngeles B3 ....127.00
Massillon,O. R2 ....107.00
Midland,Pa. C18 ....107.00
Munhall,Pa. U5 ....107.00
S.Chicago R2,U5,W14 107.00
S.Duquesne,Pa. U5 ....107.00
Struthers,O. Y1 ....107.00
Warren,O. C17 ....107.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $116.50
Buffalo R2 ....111.50
Canton,O. R2 ....114.00
Cleveland R2 ....111.50
Gary,Ind. U5 ....111.50
S.Chicago,Ill. R2,W14 111.50
S.Duquesne,Pa. U5 ....111.50

SKELP
Aliquippa,Pa. J5 ....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 ....4.625
SparrowsPoint,Md. B2 .4.625
Warren,O. R2 ....4.625
Youngstown R2, U5 ..4.625

WIRE RODS
AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 ....5.00
Alton,Ill. L1 ....6.00
Buffao W12 ....5.80
Cleveland A7 ....5.80
Donora,Pa. A7 ....5.80
Fairfield,Ala. T2 ....5.80
Houston S5 ....6.05
IndianaHarbor,Ind. Y1 ..5.80
Johnstown,Pa. B2 ....5.80
Joliet,Ill. A7 ....5.80
KansasCity,Mo. S5 ....6.05
Kokomo,Ind. C16 ....5.90
LosAngeles B3 ....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P7 ....5.80
N.Tonawanda,N.Y. B11 .5.80
Pittsburg,Calif. C11 ....6.45
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 ....5.90
S.Chicago,Ill. R2 ....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ....5.80
Sterling,Ill. N15 ....5.90
Struthers,O. Y1 ....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ....5.00
Aliquippa,Pa. J5 ....5.00
Bessemer,Ala. T2 ....5.00
Bethlehem,Pa. B2 ....5.05
Birmingham C15 ....5.30
Clairton,Pa. U5 ....5.00
Fairfield,Ala. T2 ....5.00
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....5.00
Geneva,Utah C11 ....5.00
Houston S5 ....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 ....5.05
KansasCity,Mo. S5 ....5.10
Lackawanna,N.Y. B2 ....5.05
LosAngeles B3 ....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 ....5.00
Niles,Calif. P1 ....5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 ....5.80
Seattle B3 ....5.75
S.Chicago,Ill. U5, W14 ..5.00
S.SanFrancisco B3 ....5.65
Sterling,Ill. N15 ....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ....5.00

Wide Flange
Bethlehem,Pa. B2 ....5.05
Clairton,Pa. U5 ....5.00
Fontana,Calif. K1 ....5.85
IndianaHarbor,Ind. I-2 ..5.00
Lackawanna,N.Y. B2 ....5.05
Munhall,Pa. U5 ....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 ....5.00

Alloy Std. Shapes
Clairton,Pa. U5 ....6.20
Gary,Ind. U5 ....6.20
Houston S5 ....6.30
Munhall,Pa. U5 ....6.20
S.Chicago,Ill. U5 ....6.20

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ....7.35
Bessemer,Ala. T2 ....7.35
Bethlehem,Pa. B2 ....7.40
Clairton,Pa. U5 ....7.35
Fairfield,Ala. T2 ....7.35
Fontana,Calif. K1 ....8.05
Gary,Ind. U5 ....7.35
Geneva,Utah C11 ....7.35
Houston S5 ....7.45
Ind.Harbor,Ind. I-2, Y1 7.35
Johnstown,Pa. B2 ....7.40
KansasCity,Mo. S5 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 ....8.05
Munhall,Pa. U5 ....7.35
Seattle B3 ....8.10
S.Chicago,Ill. U5, W14 ..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 ....7.35

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....7.40
Ind.Harbor,Ind. I-2 ....7.35
Lackawanna,N.Y. B2 ....7.40
Munhall,Pa. U5 ....7.35
S.Chicago,Ill. U5 ....7.35

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.05
Lackawanna,N.Y. B2 ....5.05
Munhall,Pa. U5 ....5.00
S.Chicago,Ill. U5 ....5.00

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....5.90
Lackawanna,N.Y. B2 ....5.90
Munhall,Pa. U5 ....5.90
S.Chicago,Ill. U5 ....5.90

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 ....4.85
Aliquippa,Pa. J5 ....4.85
Ashland,Ky. (15) A10 ..4.85
Bessemer,Ala. T2 ....4.85
Bridgeport,Conn. N19 ..4.75
Clairton,Pa. U5 ....4.85
Claymont,Del. C22 ....5.35
Cleveland J5, R2 ....4.95
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..4.90
Detroit M1 ....4.95
Ecorse,Mich. G5 ....4.95
Fairfield,Ala. T2 ....4.85
Fontana,Calif.(30) K1 ..5.55
Gary,Ind. U5 ....4.85
Geneva,Utah C11 ....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 ....5.80
Houston S5 ....4.95
Ind.Harbor,Ind. I-2, Y1 .4.85
Johnstown,Pa. B2 ....4.85
Lackawanna,N.Y. B2 ....4.85
LoneStar,Tex. L6 ....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 ....4.85
Newport,Ky. N9 ....4.85
Pittsburgh J5 ....4.85
Riverdale,Ill. A1 ....4.85
Seattle B3 ....5.75
Sharon,Pa. S3 ....4.85
S.Chicago,Ill. U5, W14 ..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 ....4.85
Weirton,W.Va. W6 ....4.85
Youngstown R2, U5, Y1 4.85

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.20
Fontana,Calif. K1 ....6.70
Geneva,Utah C11 ....6.00
Johnstown,Pa. B2 ....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron
Economy,Pa. B14 ....11.128

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....7.25
Bessemer,Ala. T2 ....7.25
Clairton,Pa. U5 ....7.25
Claymont,Del. C22 ....7.55
Cleveland J5, R2 ....7.25
Coatesville,Pa. L7 ....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 ....7.35
Fairfield,Ala. T2 ....7.25
Fontana,Calif.(30) K1 ..7.95
Gary,Ind. U5 ....7.25
Geneva,Utah C11 ....7.25
Houston S5 ....7.35
Ind.Harbor,Ind. I-2, Y1 7.25
Johnstown,Pa. B2 ....7.25
Munhall,Pa. U5 ....7.25
Pittsburgh J5 ....7.25
Seattle B3 ....8.15
Sharon,Pa. S3 ....7.25
S.Chicago, Ill. U5, W14 ..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 ....7.25
Youngstown U5, Y1 ....7.25

PLATES Alloy
Bridgeport,Conn. N19 ..6.55
Claymont,Del. C22 ....6.85
Coatesville,Pa. L7 ....6.85
Fontana,Calif.(30) K1 ..7.55
Gary,Ind. U5 ....6.85
Houston S5 ....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 ....6.85
Munhall,Pa. U5 ....6.85
Newport,Ky. N9 ....6.85
Seattle B3 ....7.75
Sharon,Pa. S3 ....6.85
S.Chicago,Ill. U5, W14 ..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 ....6.85

FLOOR PLATES
Cleveland J5 ....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 ....6.275
Ind.Harbor,Ind. I-2 ....5.925
Munhall,Pa. U5 ....5.925
d.Chicago,Ill. U5 ....5.925

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.10
Ashland l.c.l. (15) A10 ..5.60
Cleveland c.l. R2 ....5.60
Warren,O. c.l. R2 ....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ..5.075
Alton,Ill. L1 ....5.275
Atlanta(9) A11 ....5.575
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ....5.375
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 ....5.075
Clairton,Pa. U5 ....5.075
Cleveland(9) R2 ....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 ....5.075
Geneva,Utah(9) C11 ....5.157
Houston(9) S5 ....5.325
Ind.Harbor(9) I-2, Y1 ..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 ....5.575
KansasCity,Mo.(9) S5 ..5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 ....5.775
Milton,Pa.(23) M18 ....5.425
Minnequa,Colo. C10 ....5.525
Niles,Calif. P1 ....5.85
N.Tonawanda,N.Y.(9)B11 5.075
Pittsburg,Calif.(9) C11 .5.775
Pittsburgh(9) J5 ....5.075
Portland,Oreg. O4 ....5.85
Seattle B3, N14 ....5.825
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 ..5.075
S.SanFran.,Calif.(9) B3 5.825
Sterling,Ill.(1) N15 ....5.075
Sterling,Ill. N15 ....5.175
Struthers,O. Y1 ....5.075
Torrance,Calif.(9) C11 .5.775
Weirton,W.Va.(9)W6 ....5.075
Youngstown(9) R2, U5 5.075

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 ....7.125

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....6.125
Bridgeport,Conn. N19 ....6.20
Buffalo R2 ....6.125
Canton,O. R2 ....6.125
Clairton,Pa. U5 ....6.125
Detroit R7 ....6.125
Ecorse,Mich. G5 ....6.225
Fairless,Pa. U5 ....6.275
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 ....6.125
Houston S5 ....6.375
Ind.Harbor,Ind. I-2,Y1 6.125
Johnstown,Pa. B2 ....6.125
KansasCity,Mo. S5 ....6.375
Lackawanna,N.Y. B2 ....6.125
LosAngeles B3 ....7.175
Massillon,O. R2 ....6.125
Midland,Pa. C18 ....6.125
S.Chicago R2, U5, W14 6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 ....6.125
Warren,O. C17 ....6.125
Youngstown U5 ....6.125

BARS & SMALL SHAPES, H.S. High-Strength Low-Alloy
Aliquippa,Pa. J5 ....7.425
Bessemer,Ala. T2 ....7.425
Bethlehem,Pa. B2 ....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 ....7.425
Cleveland R2 ....7.425
Ecorse,Mich. G5 ....7.525
Fairfield,Ala. T2 ....7.425
Fontana,Calif. K1 ....8.125
Gary,Ind. U5 ....7.425
Houston S5 ....7.675
Ind.Harbor,Ind. Y1 ....7.425
Johnstown,Pa. B2 ....7.425
KansasCity,Mo. S5 ....7.675
Lackawanna,N.Y. B2 ....7.425
LosAngeles B3 ....8.125
Pittsburgh J5 ....7.425
Seattle B3 ....8.175
S.Chicago,Ill. U5, W14 ..7.425
S.DuquesnePa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 ....7.425
Youngstown U5 ....7.425

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.225
Houston S5 ....5.325
KansasCity,Mo. S5 ....5.325
Lackawanna(9) B2 ....5.075
Sterling,Ill. N15 ....5.175
Sterling,Ill.(1) N15 ....5.075

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.075
Atlanta A11 ....5.575
Joliet,Ill. P22 ....5.10
Niles,Calif. P1 ....5.85
Pittsburgh J5 ....5.075
Portland,Oreg. O4 ....5.85
SanFrancisco S7 ....5.95

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....6.20
Gary,Ind. U5 ....6.20
Houston S5 ....6.65
KansasCity,Mo. S5 ....6.65
Youngstown U5 ....6.20

BARS, C.F. Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ....9.475
Chicago W18 ....9.475
Cleveland C20 ....9.475
LosAngeles S30 ....11.10
LosAngeles P2 ....11.00
Monaca,Pa. S17 ....9.225
Newark,N.J. W18 ....9.65
Warren,O. C17 ....9.475

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2 6.85
Bridgeport,Conn. N19 ....7.20
Buffalo S5 ....6.90
Camden,N.J. P13 ....7.30
Carnegie,Pa. C12 ....6.85
Chicago W18 ....6.85
Cleveland A7, C20 ....6.85
Detroit B5, P17 ....7.05
Detroit R7 ....6.85
Donora,Pa. A7 ....6.85
Elyria,O. W8 ....6.85
FranklinPrk,Ill. N5 ....6.85
Gary,Ind. U5 ....6.85
GreenBay,Wis. P7 ....6.85
Hammond,Ind. L2, M13 6.85
Hartford,Conn. R2 ....7.35
Harvey,Ill. B5 ....6.85
LosAngeles(49) S30 ....8.30
LosAngeles P2, R2 ....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ....6.85
Midland,Pa. C18 ....6.85
Monaca,Pa. S17 ....6.85
Newark,N.J. W18 ....7.30
NewCastle,Pa.(17) H4 ....6.85
Pittsburgh J5 ....6.85
Plymouth,Mich. P5 ....7.10
Putnam,Conn. W18 ....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 ....6.85
SpringCity,Pa. K3 ....7.30
Struthers,O. Y1 ....6.85
Waukegan,Ill. A7 ....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 6.10

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa.M12,R2 8.325
Bethlehem,Pa. B2 ....8.325
Bridgeport,Conn. N19 ....8.475
Buffalo B5 ....8.325
Camden,N.J. P13 ....8.50
Canton,O. T7 ....7.425
Carnegie,Pa. C12 ....8.325
Chicago W18 ....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 ....8.525
Detroit R7 ....8.325
Donora,Pa. A7 ....8.325
Elyria,O. W8 ....8.325
FranklinPark,Ill. N5 ....8.325
Gary,Ind. R2 ....8.325
GreenBay,Wis. P7 ....8.325
Hammond,Ind. L2, M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 ....8.325
Lackawanna,N.Y. B2 ....8.325
LosAngeles P2, S30 ....10.10
Mansfield,Mass. B5 ....8.625
Massillon,O. R2, R8 ....8.325
Midand,Pa. C18 ....8.325
Monaca,Pa. S17 ....8.325
Newark,N.J. W18 ....8.50
Plymouth,Mich. P5 ....8.525
S.Chicago W14 ....8.325
SpringCity,Pa. K3 ....8.50
Struthers,O. Y1 ....8.325
Warren,O. C17 ....8.325
Waukegan,Ill. A7 ....8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 ....5.075
Atlanta A11 ....5.575
Birmingham C15 ....5.375
Bridgeport,Conn. N19 ....5.30
Buffalo R2 ....5.075
Cleveland R2 ....5.075
Ecorse,Mich. G5 ....5.425
Emeryville,Calif. J7 ....5.85
Fairfield,Ala. T2 ....5.075
Fairless,Pa. U5 ....5.225

Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U8 .....5.075
Houston B5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SandSprings,Okla. S5 ..5.575
Seattle B2, N14 .....5.825
S.Chicago,Ill. R2 .....5.075
S.Duquesne,Pa. U8 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 .5.075
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ...5.775
Youngstown R2, U8 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ½-1" B2 6.72
KansasCity,Mo. S8 ....7.00
Marion,O. P11 .....6.70
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

Chicagolita(3) C2, I-2 5.075
Chicagolita(4) I-2 ....5.075
Chicagolita(4) C2 ....5.65
Ft.Worth,Tex.(28) T4..5.525
Franklin,Pa.(4) F8 ....5.60
Franklin,Pa.(3) F8 ....5.10
JerseyShore,Pa.(4) J8 ..5.00
Marion,O.(3) P11 .....5.15
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19.5.65

BARS, Wrought Iron

Economy,Pa.(B.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.476
McK.Rks.(S.R.) L5, ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt)L5 .19.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3 ..4.725
Detroit(8) M1 .....4.775
Dravosburg,Pa. U5 ....4.675
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U8 .....4.675
Newport,Ky.(8) N9 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 .....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.6"5
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R.(14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 ....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ..4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ..5.80
Detroit M1 .....5.75
Dravosburg,Pa. U5 ....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 ....6.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ...6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 .....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg,Pa. U5 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 .....8.525
Indiana Harbor,Ind. Y1 .8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Dravosburg U5	6.65	6.90
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	...	6.65
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg,Pa. U5 ....6.90
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Dravosburg,Pa. U5 ....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Kokomo,Ind. C16 ....6.40‡
MartinsFerry,O. W10 ...6.30*
Middletown,O. A10 ....6.30†
Pittsburg, Calif. C11 ..7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ...6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....6.975

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ...9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ....8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Rhim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Frets-Moon Tube Co.
F7 Ft.Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co., Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(28) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.80
Carnegie,Pa. S18	7.75
Dravosburg,Pa. U5	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.80
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S15	14.55
Cleveland A7	14.55
Dover,O G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.55
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.20
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	....
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	8.05	9.90	12.70	15.10	....
Dearborn,Mich. D3	8.05	9.90	12.10	....	....
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	...	...	12.90	15.30	18.25
Indianapolis C8	8.10	9.95	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	....
NewHaven,Conn. D2	8.40	10.10	12.30	15.30	....
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	....
NewYork W3	...	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.65	9.80	12.60	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	...	...	16.80	20.65	....
Buffalo W12	...	...	16.80	....	....
FranklinPark,Ill. T6	...	...	17.15	21.00	25.35
Harrison,N.J. C18	...	...	16.80	20.65	25.00
NewYork W3	...	...	16.80	20.65	25.00
Palmer,Mass. W12	...	...	16.80	....	....
Trenton,N.J. R5	...	...	16.80	20.65	25.00
Worcester,Mass. A7, T6	...	...	16.80	20.65	25.00
Youngstown C8	...	...	17.15	21.00	25.35

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.95	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*†	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*†	12.075*	....
Mansfield O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*†	12.075*	13.05*
Vandergrift,Pa. U5	....	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.65	14.60	15.10	16.15
Brackenridge,Pa. A4	14.65	....	....	....
Vandergrift,Pa. U5	14.65	14.60	15.10	16.15
Zanesville,O. A10	14.65	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	16.90	18.50	19.00	19.50	14.05**	
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Worcester,Mass. J4	....	....	....	....	....	14.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.63	$9.05
Dravosburg,Pa. U5	8.40	8.65	9.06
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.06

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	....	....
Niles,O. R2	7.425	7.625	7.825

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Dravosburg,Pa. U5	9.70	9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Ind. Harbor Y1	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.90

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.80
Dravosburg,Pa. U5	7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.40
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Dravosburg,Pa. U5	7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.20
Gary,Ind. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R3	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.75
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

ROPE WIRE (A)

Bartonville,Ill. K4	11.35
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.55
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.40
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester A7, J4, T6	9.025

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	13.55
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.25
Monessen,Pa. P16	14.45
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES, Stock — **Col.**

AlabamaCity, Ala. R2	164
Aliquippa,Pa. (7) J5	167
Atlanta A11	166
Bartonville,Ill. (7) K4	169
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
KansasCity,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill. (1) N15	164
Worcester,Mass. A7	170

NAILS, Stock — **Col.**

Chicago (7) W13	167
Cleveland (7) A9	173

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg) To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	10.13
Buffalo W12	10.05
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	9.53
Duluth A7	9.53
Houston 85	9.78
Jacksonville,Fla. M8	10.58
Johnstown,Pa. B2	9.53
Joliet,Ill. A7	9.53
KansasCity,Mo. S5	9.78
Kokomo,Ind. C16	9.63
LosAngeles B3	10.32
Minnequa,Colo. C10	9.78
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.63
Sterling,Ill.(1) N15	9.53

Coil No. 6500 Stnd.

AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	9.85
Duluth A7	9.85
Houston 85	10.10
Kokomo,Ind. C16	9.95
Jacksonville,Fla. M8	10.91
Johnstown,Pa. B2	9.85
Joliet,Ill. A7	9.85
KansasCity,Mo. S5	10.10
Kokomo,Ind. C16	10.45
LosAngeles B3	10.65
Minnequa,Colo. C10	10.10
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	10.65
SparrowsPt.,Md. B2	9.95
Sterling,Ill.(1) N15	9.85

Coil Interim

AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	9.90
Duluth A7	9.90
Houston 85	10.15
Jacksonville,Fla. M8	10.96
Johnstown,Pa. B2	9.90
Joliet,Ill. A7	9.90
KansasCity,Mo. S5	10.15
Kokomo,Ind. C16	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	10.15
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	10.00
Sterling,Ill.(1) N15	9.90

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	184**
Aliquippa, Pa. J5	184‖
Atlanta A11	190*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	193
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	189**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	188*
Joliet,Ill. A7	184†
KansasCity,Mo. S5	189**
Kokomo,Ind. C16	186†
Minnequa,Colo. C10	189**
Monessen,Pa. P7	191*
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184**
S.SanFrancisco C10	207**
SparrowsPoint,Md. B2	190*
Sterling,Ill(1) N15	188*

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	176**
Aliq'ppa,Pa. 9-14½ga.J5	184‖
Atlanta A11	182*
Bartonville,Ill. K4	187
Crawfordsville,Ind. M8	187
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	181**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	180*
Joliet,Ill. A7	176†
KansasCity,Mo. S5	181**
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181**
Monessen,Pa. 9 ga. P7	185*
Pittsburg,Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(1) N15	180*

WIRE (16 gage)	Stone	An'ld Galv. Stone
Ala.City,Ala.R2	15.70	17.25**
Bartonville K4	16.10	18.05
Buffalo W12	16.10	—
Cleveland A7	15.70	17.25†
Crawf'dsville M8	16.20	18.15
Fostoria,O. S1	16.20	17.75†
Houston 85	15.95	17.50**
Jacksonville M8	16.45	18.40
Johnstown B2	16.10	18.05*
Kan.City,Mo.85	15.95	17.50**
Kokomo C16	15.80	17.35†
Minnequa C10	16.05	17.75**
P'lm'r,Mass.W2	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	15.70	17.25†
Worcester A7	16.00	—

WIRE, Merchant Quality (6 to 8 gage) — **An'ld Galv.**

Ala.City,Ala. R2	7.95 8.35**
Aliquippa J5	8.10 8.625‖
Atlanta A11	8.05 8.65*
Bartonville(48) K4	8.20 8.80
Buffalo W12	8.10 8.50†
Cleveland A7	7.95 —
Crawfordsville M8	8.20 8.80
Donora,Pa. A7	7.95 8.35†
Duluth A7	7.95 8.35†
Fairfield T2	7.95 8.35†
Houston(48) 85	8.20 8.60**
Jacks'ville,Fla. M8	8.45 9.05
Johnstown B2(48)	7.95 8.55*
Joliet,Ill. A7	7.95 8.35†
Kans.City(48) 85	8.20 8.60**
Kokomo C16	8.05 8.45†
LosAngeles B3	8.90 9.50*
Minnequa, C10	8.20 8.60**
Monessen P7 (48)	8.10 8.70*
Palmer,Mass. W12	8.40 8.80†
Pitts.,Calif. C11	8.90 9.30†
Portsmouth,O. P12	8.10 —
Rankin,Pa. A7	7.95 8.35†
S.Chicago R2	7.95 8.35**
S.SanFran. C10	8.90 9.30**
Spar'wsPt. B2(48)	8.05 8.65*
Sterling(1)(48)N15	7.95 8.55*
Struth'rs,O.(48)Y1	7.95 8.45‡
Worcester,Mass.A7	8.25 8.65†

Based on zinc price of: *13.50c. †5c. ‖10c. ‡Less than 10c. ††13. **Subject to zinc equalization extras.

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	190
Atlanta A11	192
Bartonville,Ill. K4	197
Crawfordsville,Ind. M8	197
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Houston 85	195
Jacksonville,Fla. M8	202
Joliet,Ill. A7	190
KansasCity,Mo. S5	195
Kokomo,Ind. C16	192
Minnequa,Colo. C10	195
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
SparrowsPoint.,Md. B2	192
Sterling,Ill. N15	190
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W. Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Sterling,Ill. N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter . . 55
Longer than 6 in. . . 46.5
⅞ in. thru 1 in.:
6 in. and shorter . . 46.5
Longer than 6 in. . . 44
1⅛ in. and larger:
All lengths 44
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter . . 55

Carriage, Machine, Lag Bolts

Hot Galvanized:
½ in. and smaller:
6 in. and shorter . . 35
Longer than 6 in. . . 23
⅞ in. thru 1 in.:
6 in. and shorter . . 20
Longer than 6 in. . . 20
1⅛ in. and larger:
All lengths 20

Lag Bolts
All diameters:
6 in. and shorter 55
Longer than 6 in. 47

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 54
Larger than ½ in. or longer than 6 in. 47

Blank Bolts 47
Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:
All sizes 59

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 45

Hex Nuts, Reg. & Heavy, Hot Pressed:
⅝ in. and smaller . . 63
⅞ in. to 1 in. incl. . . 59.5
1⅛ in. to 1½ in., incl. . . 64
1⅝ in. and larger . . 58

Hex Nuts, Reg. & Heavy, Cold Punched:
⅝ in. and smaller . . 63
⅞ in. to 1½ in., Incl. . . 59.5
1⅝ in. and larger . . 58

Hex Nuts, All Types, Hot Galvanized:
⅝ in. and smaller . . 50
⅞ in. to 1 in., incl. . . 46
1⅛ in. to 1½ in., incl. 51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):
⅝ in. and smaller . . 63
⅞ in. to 1½ in., incl. . . 59.5
1⅝ in. and larger . . 58

Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller . . 65
1⅛ in. to 1½ in., incl. 62
1⅝ in. and larger . . 58

CAP AND SET SCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread

Bright:
6 in. and shorter:
⅝ in. and smaller . . 47
¾, ⅞ and 1 in. diam. 31
Longer than 6 in.:
⅝ in. and smaller . . 18.5
¾, ⅞ and 1 in. diam. 5.5

High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller . . 34
¾, ⅞ and 1 in. diam. 13
Longer than 6 in.:
⅝ in. and smaller . . + 1
¾, ⅞ and 1 in. diam. . . . . + 19

Fillister Head, Coarse Thread:
Listed Sizes . . . . . + 31

Flat Head, Coarse Thread:
¼ in. and smaller by 6 in. and shorter . . + 57

Set Screws, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter . . 11
Longer than 6 in. . . + 10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85
$\frac{1}{16}$-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13		23.56	22.84
1¼	13		27.92	22.68
1½	13	26.34	30.86	25.08
1⅝	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2⅝	12	46.98	55.01	44.73
2⅞	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Toe Rails All No. 2	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W. Va. W7	....	....	....	6.15
Indiana Harbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	...(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	...(16)	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minnequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton, Pa. B2	6.35

AXLES

Ind.Harbor,Ind. S13	8.10
Johnstown,Pa. B2	8.10

TRACK BOLTS, Untreated

Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60

SCREW SPIKES

Cleveland R2	12.85
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	8.775
Minnequa, Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.23c; 1 15/16 to 4 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6.7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	9	+21.5	0.5	+28	+9.5	+37	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Wheatland, Pa. W9	11	+19.5	1.5	+26	+7.5	+35	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	19	1.5	19.5	2	21	2.75	21	2.75	11	+7.25	11	+7.25
Wheatland, Pa. W9	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	35.75	37.25	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	34.00	38.25	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	41.50	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	39.75	40.75	43.00	45.75	50.25	50.25
304L	....	....	43.50	46.75	48.25	50.50	53.25	57.75	57.75
305	24.75	32.50	37.75	43.00	40.75	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	58.50	57.50	60.50	64.25	73.50	73.50
310	42.25	53.75	69.00	75.50	77.50	81.50	83.25	87.00	87.00
314	....	....	....	....	77.50	....	83.25	....	....
316	35.25	44.50	56.25	63.50	63.50	66.75	70.25	74.75	74.75
316L	....	....	63.75	70.00	71.00	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	81.50	79.50	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	50.25	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets—Carbon Base 20%
Stainless					
302	....	....	....	....	33.25
304	....	34.50	....	41.50	35.25
304-L	....	37.20	....	44.65	....
316	....	38.70	....	46.65	52.25
316-L	....	45.70	....	54.35	....
316-CB	....	45.90	....	54.75	....
321	....	36.35	....	43.40	42.00
347	....	39.50	....	48.45	51.00
405	....	29.20	....	37.05	....
410	....	28.70	....	36.55	....
430	....	28.70	....	36.55	....
Inconel	45.70	54.80	63.85	73.00	....
Nickel	37.95	46.25	54.60	62.95	....
Nickel, Low Carbon	38.25	46.90	55.60	64.40	....
Monel	40.30	49.10	57.95	66.80	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	34.40	40.65

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7575
18	4	2	....	....	1.945
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 2% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity, Ala. R2	58.50	59.00	....	....
Birmingham R3	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	63.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.80	65.30	65.30	65.80
Muskegon,Mich., deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
NewYork, deld.	....	69.01	69.51	....
Newark,N.J., deld.	67.70	68.20	68.70	69.20
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland, Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.95
McKeesRocks,Pa. deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca,Pa., deld.	....	64.76	64.76	65.29
Verona, Trafford,Pa., deld.	64.79	65.32	65.32	65.85
Brackenridge,Pa., deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	62.00	....
Sharpeville,Pa. S6	62.50	....	62.00	63.50
Youngstown Y1	....	....	62.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	63.25	63.75	64.25	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex. L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	66.26	66.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
‡Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; intermediate (Phos. 0.31-0.69%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon: add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$97.50
NiagaraFalls,N.Y. P15	97.50
Keokuk,Iowa, Open-hearth & Pdry, freight allowed K2	102.00
Keokuk, O.H. & Pdry, 12½ lb pigiets, 16% Si, frgt allowed K2	105.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

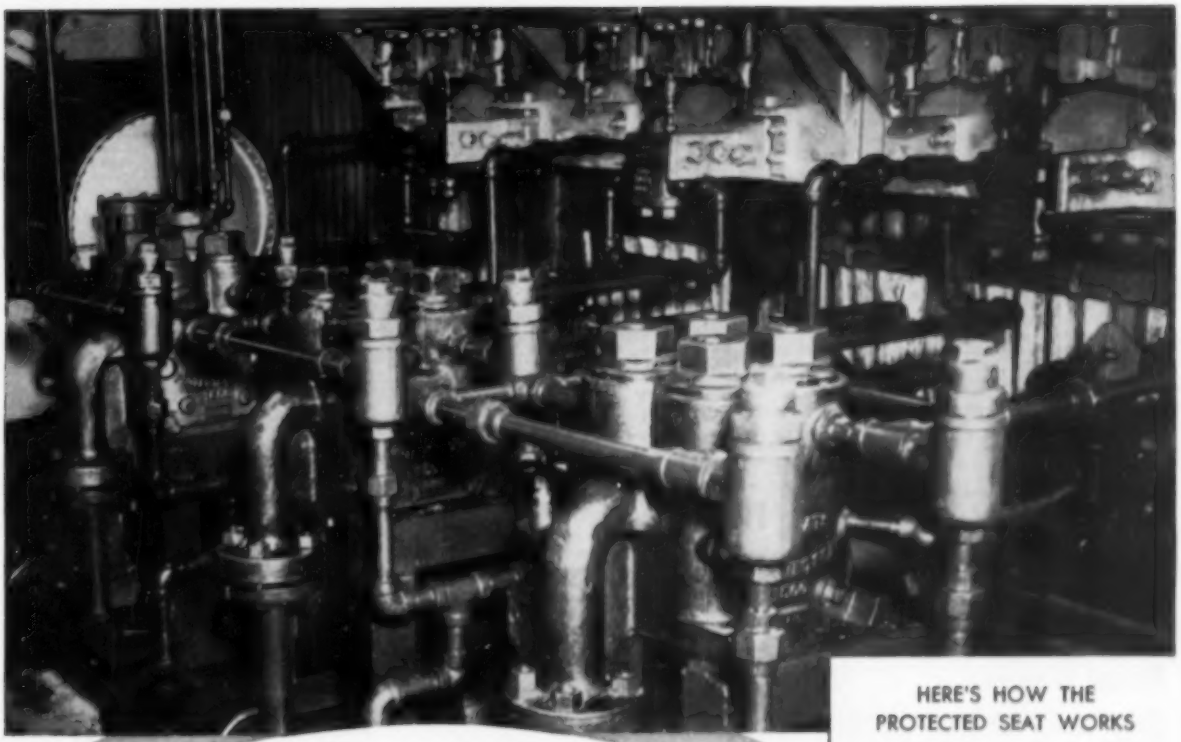
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	8.07‖	9.27‖	9.83‖	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.24	8.87	9.00¶	15.69	8.57	8.12	10.81
Birmingham	7.68‖	8.85‖	8.85‖	....	7.75	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	11.02	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‖	9.10‖	9.10‖	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.75	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.78	....	8.06	8.19	8.72	8.82	14.23	8.55	8.84	9.53
Cleveland	7.68	8.88	9.60	....	7.85	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	16.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60¶	....	7.90	8.00	8.65	8.70¶	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.24	9.09	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.00‖	9.20‖	9.22‖	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.80	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.26
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	...	8.70	....	7.78	8.36	...
New York	8.35	9.53	10.23	57.73	8.81	8.53	9.38	10.61	14.37	8.74	8.78	10.65
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.30	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.56	8.37	8.90	9.12	14.15	8.38	8.28	9.27
Pittsburgh	7.68	8.88	10.05	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
Portland, Oreg.	8.90	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.78	9.30	10.06	....	8.90	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.29	8.48	8.34	9.80
St. Paul	8.29	9.49	10.31	....	8.39	8.53	...	9.21	....	8.75	8.71	9.87
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	10.45	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	10.50	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.37	10.57	...	....	9.06	8.92	...	9.67	....	9.15	8.79	10.14

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 25-cent bar quality extras; **⅛-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ‖—400 to 999 lb; ¶—1000 to 1999 lb; #—2000 to 3999 lb; ‖‖—2000 lb and over.



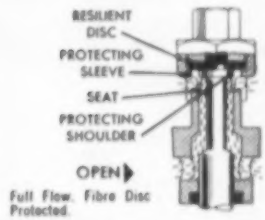
for fast, smooth, accurate control

Specify HOMESTEAD *Protected Seat* HYDRAULIC OPERATING VALVES

RECORDS OF 6 TO 18 MONTHS' MAINTENANCE-FREE SERVICE ARE COMMON

It will pay you to get the facts about HOMESTEAD Protected-Seat HYDRAULIC OPERATING VALVES—the valves that give you quick, finger-tip control for moving or positioning any single-acting or double-acting hydraulic piston. The exclusive Homestead Protected-Seat reduces fluid velocity during the closing operation to practically zero. Thus seat erosion and resultant leakage, the most frequent cause of shut-downs and lost production time, is eliminated. Records of 6 to 18 months continuous service without maintenance are common.

HERE'S HOW THE PROTECTED SEAT WORKS



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Flow practically stopped by close fitting sleeve and stem shoulder, before seat and disc make contact. This prevents "wire drawing." Trapped water cushions closing, dampens hydraulic shock.

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Protected resilient disc against metal seat assures drop-tight seal, long life, accurate control, and low maintenance.

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CITY_____ STATE_____

HOMESTEAD
VALVE MANUFACTURING COMPANY
"Serving Since 1892"
P.O. BOX 22, CORAOPOLIS, PA.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Ft. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 Per Cent: St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Nario, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., Luning, Nev. $43; ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00-34.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$28.50-29.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
Swedish, c.i.f. Camden, N.J., e.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	26.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght, allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	36.80-46.80†
Bronze, 5000-lb lots	56.20-60.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	55.10-58.40†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	48.50-56.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.05
Stainless Steel, 316	$1.40
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten: Dollars	
Melting grade, 99%	
60 to 200 mesh:	
1000 lb and over	4.20
Less than 1000 lb	4.35
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 30% Zn, 10% Ni, **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	90	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.50
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N.J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa., ovens	29.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearney, N.J., ovens	28.75
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	29.50
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
Neville Island (Pittsburgh), Pa., ovens	28.25
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	28.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.40	$7.40	$7.40	$7.65
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.40	7.40	7.40	7.70
I-Beams	7.75	7.75	7.75	8.15
Plates	9.50	9.50	9.50	10.00
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft. ⅞ x 0.30 lb per ft.	27.02	27.02	27.02	27.49
Barbed Wire (†)	6.61	6.61	6.61	6.96
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	7.90	7.90	7.90	8.02

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

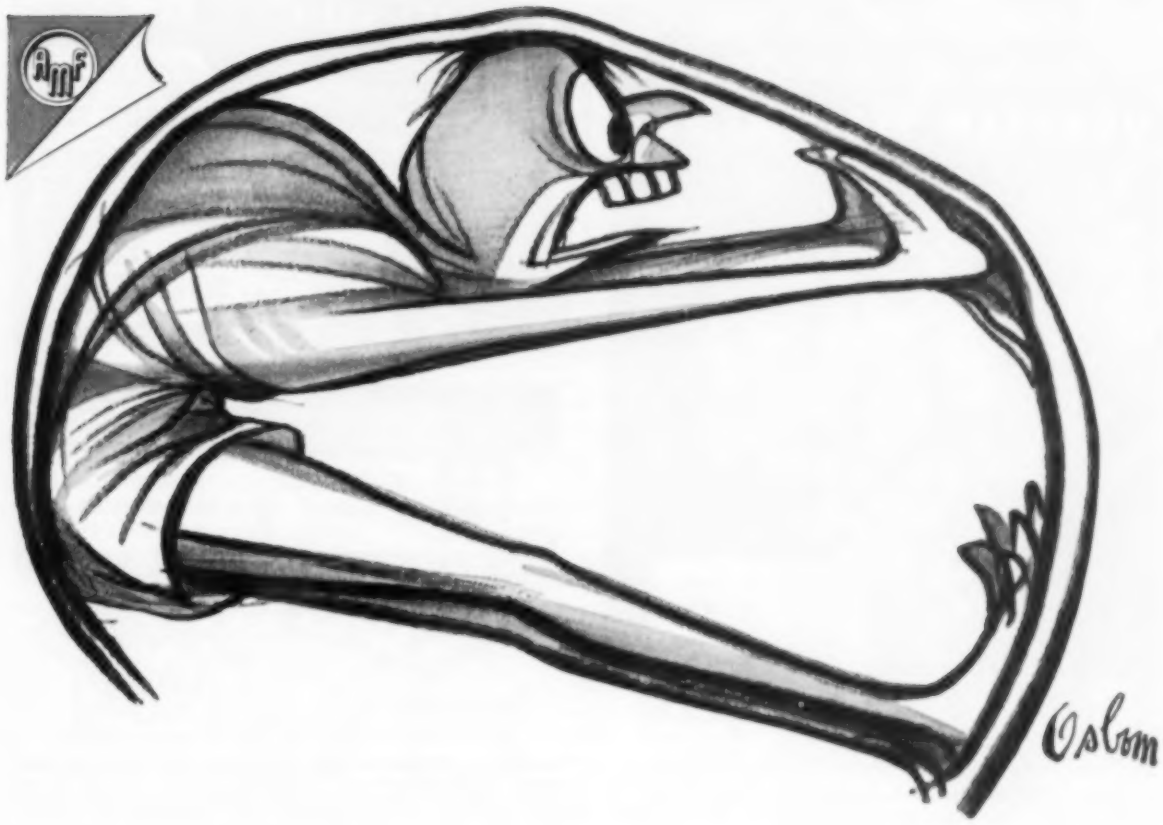
Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.90; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.



STRESS

can be a hidden enemy of circular parts like jet-engine rings. To insure physical and metallurgical accuracy, specify Cleve-Weld welded rings.

Top Jet-Engine makers specify Cleve-Weld rings

The *design*, *metallurgy* and *production* of welded circular parts have been Cleve-Weld specialties for 45 years. We've worked with materials from carbon to stainless and the latest aircraft alloy steels. Cleve-Weld has the specialized equipment and experience to do exacting jobs. These are the reasons why America's jet-engine makers procure Cleve-Weld rings. Pratt & Whitney J-57, Wright Aeronautical J-65, General Electric J-47 and other great jet engines testify to our ring accuracy.

Cleve-Weld is also a prime supplier of truck and tractor rims, rings, bands and gear blanks. *Make Cleve-Weld your primary source for all rolled and welded circular parts, too.* We'll show you why in dollars and cents. Write Circular Welded Products Sales Department below.

THIS IS THE BASIC CLEVE-WELD PROCESS.
Rectangular bars or special contoured sections of steel are rolled into a circular form. Next, the part is welded and then expanded into a true circle. This tests the weld and insures accuracy. Later operations add stress relief and desired hardness.

EXAMPLES OF CLEVE-WELD PROCESS PRODUCTS

Another AMF Product
CLEVE-WELD PROCESS
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AMERICAN MACHINE & FOUNDRY COMPANY
Cleveland 11, Ohio

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West 117th Street and Berea Road
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☐ Tractor Rim Catalog
☐ Brochure on Cleve-Weld Process

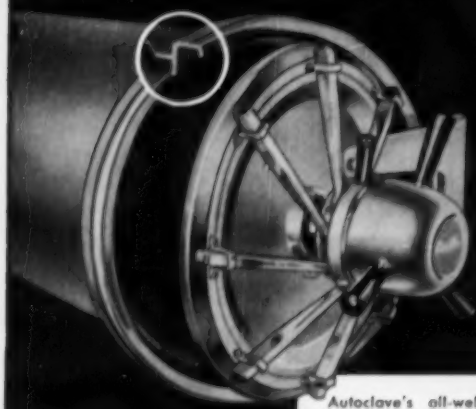
Name_____

Title_____

Attach to your company letterhead and mail

Why cast...forge...or hog it... if you can do it better with a

DRESSER WELDMENT?



Autoclave's all-welded construction eliminates rivets, other sources of leakage. Monel weldments effect substantial savings in fabrication.

If you have angle or channel shaped rings in circular assemblies that are hard to make and subject to high rejections, they can probably be made better and cheaper with Dresser Weldments.

Contour bars—extruded or shaped by specially designed mill rolls—leave a minimum of excess stock for finishing. Formed, automatically flash-welded and expanded to accurate dimensions, many special-shaped parts and rings need little or no machining. Often, savings on end scrap alone pay for the finished part.

Typical Dresser Weldments

- *Rings and Cylinders*—circular elements may also be combined into composite weldment.
- *Hot-Formed Circular Parts* — extensive banks of presses and furnaces offer you economies in volume production.
- *Shafts or Circular Parts Welded from Dissimilar Metals* — available with a portion of the part resistant to heat, corrosion or abrasion—or provided with greater strength or hard surface in a localized section.

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DRESSER WELDMENTS

Dresser Manufacturing Division

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DYKEM STEEL BLUE

Stops Losses making Dies and Templates

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

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To Lower your Overhead..

BROWNING ELECTRIC TRAVELING CRANES AKD HOISTS

up to 125-TON CAPACITY

VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland), OHIO

H&C Insert Chaser DIE HEADS

famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

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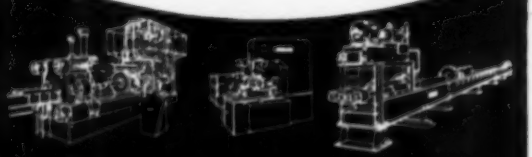

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Trend in Scrap Prices Reversed

STEEL's composite on the steelmaking grades declines to $65, recording first drop in market since mid-October. Sluggish buying expected over the holidays

Scrap Prices, Page 142

Chicago—The scrap market appears to have passed its peak. Mills continue to stay out of the market, and brokers are close to completing old orders. Brokers are offering $2 to $3 a ton less for material than they were a week ago. Two mills have offered to buy No. 1 factory bundles, No. 1 industrial heavy melting and electric furnace scrap at prices which are from $3 to $5 under the recent market.

Pittsburgh—Excitement of the past few weeks has tapered off in the local scrap market. Steelmakers filled their immediate requirements at the beginning of this month. They are expected to make no large-scale purchases until the end of December. Prices are stationary.

Lack of interest in primary grades is due in part to stiffening buyer resistance against recent price hikes.

Philadelphia—Prices are strong and unchanged, except for an advance in low phos structurals and plates, which are slightly higher at $68-$70, delivered. Buying is comprised of small scattered orders for domestic account. Little is moving abroad. One export cargo left here early this month, and it is believed it will be the last to be shipped from this port this year.

New York—Following the general advance of a week ago, scrap brokers' buying prices have leveled off on the major grades. However, on 18-8 borings and turnings, prices are higher at $335-$360, reflecting strength in nickel.

Boston — No. 2 heavy melting steel and bundles are quoted higher, brokers advancing their buying prices up to $1.50 a ton. Borings and turnings also have edged upward with an average increase of $1. In some buying, No. 1 bundles and No. 1 busheling commands a slightly higher price than No. 1 heavy melting. For direct shipment, $55, shipping point, is paid for No. 1 busheling.

Cleveland—In the absence of representative buying, prices on the steelmaking grades of scrap are unchanged here and in the Valley. No. 1 is quoted $64.50-$65.50 at Cleveland, and $66-$67 in the Valley. Not much in the way of buying is anticipated in the market until after the holidays.

Youngstown—Demand for scrap is strong here and pressure is building up for higher prices. No new sales have been reported for December. Last sales of No. 1 heavy melting by dealers was at $65-$66, and No. 1 bundles at $64-$65. However, some direct-purchase tonnage was moved at $69-$70. A sale of No. 2 heavy melting at $58 also was reported.

Buffalo—A large mill purchased principal grades of scrap at prices sharply above those paid previously. No. 1 heavy melting went at $63, No. 2 heavy melting at $53 and No. 2 bundles at $49. The mill was forced to offer higher prices to prevent area scrap from moving to Pittsburgh and Youngstown.

Even with the higher prices here, scrap is coming out slowly, and the mills are reported having difficulty maintaining inventories. But their reserves are said to be comfortable.

Detroit—Scrap prices are firm and unchanged. District steel operations last week were estimated at 103 per cent of capacity. This compares with 99 the preceding week and 99 a year ago.

Cincinnati—After shooting upward to the highest level in history, scrap prices have leveled off here with brokers offering $62-$63 for No. 1 heavy melting steel. The market continues strong. Orders from local consumers appear to be in balance with offerings.

St. Louis—Scrap prices are unchanged in the absence of new sales. There has been a noticeable improvement in shipments. Higher prices are expected when buying is resumed.

Birmingham — Electric furnace scrap shows considerable strength. Advances of $2 a ton were registered last week in most specialty items. Brokers attribute this to the small tonnage available and capacity furnace operations.

Dealers report more scrap is coming into their yards with the ending of the cotton picking

(*Please turn to page* 148)

WHY YOU'LL LIKE TO STAY AT
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You've heard of "traditional Maryland hospitality"? We didn't invent it, but we surely keep it going! Teletype: BA263.

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 12	$65.50
Dec. 5	66.17
Nov. Avg.	61.83
Dec. 1955	50.37
Dec. 1951	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	66.00-67.00
No. 2 heavy melting	58.00-59.00
No. 1 bundles	66.00-67.00
No. 2 bundles	53.00-54.00
No. 1 busheling	66.00-67.00
Machine shop turnings	44.00-45.00
Mixed borings, turnings	44.00-45.00
Short shovel turnings	48.00-49.00
Cast iron borings	48.00-49.00
Cut structurals, 3 ft. lengths	73.00-74.00
Heavy turnings	59.00-60.00
Punchings & plate scrap	73.00-74.00
Electric furnace bundles	73.00-74.00

Cast Iron Grades

No. 1 cupola	56.00-57.00
Heavy breakable cast	54.00-55.00
Unstripped motor blocks	41.00-42.00
No. 1 machinery cast	63.00-64.00

Railroad Scrap

No. 1 R.R. heavy melt.	71.00-72.00
Rails, 2 ft and under	81.00-82.00
Rails, 18 in. and under	82.00-83.00
Rails, random lengths	79.00-80.00
Railroad specialties	75.00-76.00

Stainless Steel Scrap

18-8 bundles & solids	480.00-520.00
18-8 turnings	400.00-420.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	64.50-65.50
No. 2 heavy melting	50.00-51.00
No. 1 bundles	64.50-65.50
No. 2 bundles	44.00-45.00
No. 1 busheling	64.50-65.50
Machine shop turnings	35.00-36.00
Mixed borings, turnings	38.00-39.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Cut foundry steel	62.00-63.00
Low phos.	65.50-66.50
Cut structural plates 2 ft and under	71.00-72.00
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	65.50-66.50

Cast Iron Grades

No. 1 cupola	59.00-60.00
Charging box cast	52.00-53.00
Heavy breakable cast	50.00-51.00
Stove plate	55.00-56.00
Unstripped motor blocks	39.00-40.00
Brake shoes	47.00-48.00
Clean auto cast	57.00-58.00
Burnt cast	44.00-45.00
Drop broken machinery	60.00-61.00

Railroad Scrap

No. 1 R.R. heavy melt.	68.00-69.00
R.R. malleable	71.00-72.00
Rails, 2 ft and under	86.00-87.00
Rails, 18 in. and under	87.00-88.00
Rails, random lengths	83.00-84.00
Cast steel	71.00-72.00
Railroad specialties	77.00-78.00
Uncut tires	76.00-77.00
Angles, splice bars	78.00-79.00
Rails, rerolling	85.00-86.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-500.00
18-8 turnings	300.00-310.00
430 clips, bundles, solids	115.00-120.00
430 turnings	55.00-65.00

YOUNGSTOWN

No. 1 heavy melting	66.00-67.00
No. 2 heavy melting	57.00-58.00
No. 1 bundles	66.00-67.00
No. 2 bundles	49.00-50.00
No. 1 busheling	66.00-67.00
Machine shop turnings	36.00-37.00
Short shovel turnings	43.00-44.00
Cast iron borings	43.00-44.00
Low phos.	68.50-69.50
Electric furnace bundles	68.50-69.50

Railroad Scrap

No. 1 R.R. heavy melt.	69.00-70.00

CHICAGO

No. 1 heavy melting	*66.00-68.00*
No. 2 heavy melting	53.00-54.00
No. 1 factory bundles	*69.00-70.00*
No. 1 dealer bundles	*65.00-66.00*
No. 2 bundles	48.00-49.00
No. 1 busheling	*66.00-68.00*
Machine shop turnings	*37.00-38.00*
Mixed borings, turnings	*39.00-40.00*
Short shovel turnings	*39.00-40.00*
Cast iron borings	*39.00-40.00*
Cut structurals, 3 ft	*71.00-72.00*
Punchings & plate scrap	*72.00-73.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	*69.00-70.00*
R.R. malleable	70.00-71.00
Rails, 2 ft and under	*89.00-90.00*
Rails, 18 in. and under	*90.00-91.00*
Angles, splice bars	*80.00-81.00*
Rails, rerolling	93.00-94.00

Stainless Steel Scrap

18-8 bundles & solids	505.00-515.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	60.00-65.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	59.00
No. 2 heavy melting	49.00
No. 1 bundles	60.00
No. 2 bundles	40.00
No. 1 busheling	59.00
Machine shop turnings	31.00
Mixed borings, turnings	33.00
Short shovel turnings	34.00
Punchings & plate scrap	64.00-65.00

Cast Iron Grades

No. 1 cupola	49.00
Charging box cast	43.00
Stove plate	45.00
Heavy breakable	44.00
Unstripped motor blocks	32.00
Clean auto cast	54.00
Malleable	54.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	58.00
No. 2 heavy melting	48.50
No. 1 bundles	58.00
No. 2 bundles	44.00
No. 1 busheling	58.00
Machine shop turnings	36.00
Short shovel turnings	38.50

Cast Iron Grades

No. 1 cupola	51.00
Charging box cast	46.50
Heavy breakable cast	46.50
Unstripped motor blocks	45.50
Brake shoes	51.00
Clean auto cast	53.00
Stove plate	44.50

Railroad Scrap

No. 1 R.R. heavy melt	66.50
Rails, 18 in. and under	86.00
Rails, rerolling	90.00
Rails, random lengths	85.00
Anngles, splice bars	72.00

PHILADELPHIA

No. 1 heavy melting	63.00
No. 2 heavy melting	55.00-56.00
No. 1 bundles	63.00
No. 2 bundles	53.00-54.00
No. 1 busheling	63.00
Electric furnace bundles	65.00-66.00
Mixed borings, turnings	45.00-46.00
Machine shop turnings	45.00-46.00
Short shovel turnings	49.00-50.00
Heavy turnings	58.00-59.00
Structurals & plates	*68.00-70.00*
Couplers, springs, wheels	72.00
Rails, crops, 2 ft & under	82.00-83.00

Cast Iron Grades

No. 1 cupola	52.00-54.000
Malleable	68.00
Heavy breakable cast	59.00
Drop broken machinery	59.00-60.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	48.00-49.00
No. 1 bundles	56.00-57.00
No. 2 bundles	46.00-47.00
Machine shop turnings	35.00-36.00
Mixed borings, turnings	35.00-36.00
Short shovel turnings	41.00-42.00
Low phos. (structural & plate)	59.00-60.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	37.00-38.00
Heavy breakable	48.00-49.00

Stainless Steel

18-8 heets, clips, solids	475.00-485.00
18-8 borings, turnings	*335.00-360.00*
420 sheets, clips, solids	110.00-115.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	53.00-54.00
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*54.00-55.00*
No. 2 bundles	*40.50-41.50*
No. 1 busheling	*54.00-55.00*
Machine shop turnings	*33.00-34.00*
Mixed borings, turnings	*34.50-35.00*
Short shovel turnings	*37.00-38.00*
No. 1 cast	45.50-46.50
Mixed cupola cast	43.00-44.00
No. 1 machinery cast	46.00-47.00

BUFFALO

No. 1 heavy melting	*62.00-63.00*
No. 2 heavy melting	*52.00-53.00*
No. 1 bundles	*62.00-63.00*
No. 2 bundles	*48.00-49.00*
No. 1 busheling	*62.00-63.00*
Mixed borings, turnings	38.00-39.00
Machine shop turnings	39.00-40.00
Short shovel turnings	43.00-44.00
Cast iron borings	34.00-35.00
Low phos.	*65.00-66.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	71.00-72.00
Rails, 3 ft and under	77.00-78.00
Railroad specialties	70.00-71.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	62.00-63.00
No. 2 heavy melting	52.00-53.00
No. 1 bundles	62.00-63.00
No. 2 bundles	46.00-47.00
No. 1 busheling	62.00-63.00
Machine shop turnings	41.50-42.50
Mixed borings, turnings	39.50-40.50
Short shovel turnings	43.50-44.50
Cast iron borings	39.50-40.50
Low phos. 18 in.	*68.00-69.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	64.00-65.00
Rails, 18 in. and under	82.00-83.00
Rails, random lengths	74.00-75.00

BIRMINGHAM

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	44.00-45.00
No. 1 bundles	46.00-47.00
No. 2 bundles	38.00-39.00
No. 1 busheling	46.00-47.00
Cast iron borings	27.00-28.00
Short shovel turnings	37.00-38.00
Machine shop turnings	36.00-37.00
Bar crops and plate	*62.00-63.00*
Structurals & plate, 2 ft	*61.00-62.00*
Electric furnace bundles	*56.00-57.00*
Cut foundry steel	*54.00-55.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	52.00-53.00
Stove plate	51.00-52.00
Unstripped motor blocks	44.00-45.00
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*63.00-64.00*
Rails, 18-in. and under	*76.00-77.00*
Rails, rerolling	*82.00-83.00*
Rails, random lengths	*71.00-72.00*
Angles, splice bars	*68.00-69.00*

SEATTLE

No. 1 heavy melting	54.00
No. 2 heavy melting	51.00
No. 1 bundles	51.00
No. 2 bundles	31.00
Machine shop turnings	28.00-30.00
Mixed borings, turnings	28.00-30.00
Electric furnace No. 1	62.00-65.00

Cast Iron Grades

No. 1 cupola	54.00-56.00
Heavy breakable cast	46.00
Unstripped motor blocks	48.00-50.00
Stove plate (f.o.b. plant)	40.00-42.00

LOS ANGELES

No. 1 heavy melting	**55.00**
No. 2 heavy melting	**54.00**
No. 1 bundles	**54.00**
No. 2 bundles	**47.00**
Machine shop turnings	**32.00**

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	62.00

SAN FRANCISCO

No. 1 heavy melting	55.00
No. 2 heavy melting	52.00
No. 1 bundles	54.00
No. 2 bundles	40.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	38.00
Cut structurals	62.00

Cast Iron Grades

No. 1 cupola	*57.00*
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	*57.00*
No. 1 wheels	48.00
Drop broken machinery	60.00

HAMILTON, ONT.

No. 1 heavy melting	*54.00*
No. 2 heavy melting	47.00
No. 1 bundles	*54.00*
No. 2 bundles	40.50
Mixed steel scrap	46.00
Busheling, new factory:	
Prepared	*52.00*
Unprepared	*48.00*
Short steel turnings	35.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.

Leaders in Iron & Steel Scrap Since 1889
For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in iron or steel scrap—no matter how big or small.
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Zinc Heads for Good Year

Shipments will not reach the record of 1955. U.S. helps keep market firm through stockpile and barter purchases. Department of Commerce will push barter program in '57

Nonferrous Metal Prices, Pages 146 & 147

IN RETROSPECT, 1956 may be called the year when government zinc purchases turned an otherwise mediocre 12 months into an excellent year.

Facts—Last year, domestic zinc shipments were a record 1,007,619 tons. The government purchased 87,200 tons for stockpile. This year, domestic shipment totals will reach an estimated 878,498 tons. The U.S. will take about 158,660 tons. Domestic shipments, plus government take, shape up like this: 1955—1,094,819 tons; 1956—1,037,158 tons.

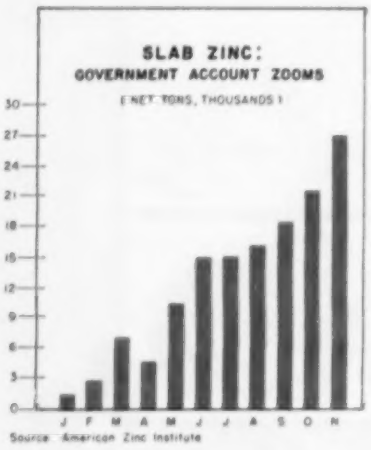
Shipments to stockpile during the last three months (see chart) included barter purchases of 7600 tons in September; 6640 tons in October; 13,070 tons in November.

Outlook — The zinc diecasting and galvanizing industries are helping to keep the market firm. Orders for zinc from the brass mills are at a low ebb. The American Iron & Steel Institute reports that some 2.46 million tons of galvanized sheets were shipped during the first ten months of 1956. Last year's ten-month total: 2.35 million tons.

Look for 1957 to be a record year for the zinc industry. Reasons: 1. Some 65 lb of zinc are being used on each 1957 automobile. 2. Galvanizers should operate at peak levels during most of the year. 3. The U.S. will continue to drain off excess zinc from foreign markets. 4. Zinc diecasters are developing added confidence as first quarter orders flow in.

Note on Stockpiling

More emphasis will be placed on the Agriculture department's barter program in '57. It must get rid of perishable agricultural surpluses. The barter program allows it to do this, and, in the process, it helps to keep metal prices (lead, zinc) at high levels. As stockpile objectives are being reached, industry observers point out that the Department of Interior holds the key to any new program. It will



present its views in the form of a recommended plan for the metals industry during the first quarter.

Guesstimate on what the recommendations will be: Lead and zinc will be helped by having foreign excesses removed. If copper shipments continue to slip, the U.S. will start to stockpile the red metal again because the copper quota has not been filled. Aluminum will not be sent to U.S. stockpile unless the industry develops an undesirably high inventory in 1957. Congress will allot the necessary funds to lend support to the metals industry (on a need basis) through some type of supplementary stockpiling.

Lead Buyers Hesitate

The British Board of Trade will dispose of some of its stockpiled lead and zinc. The announcement caused lead buyers in this country and abroad to develop a wait-and-see attitude. Commented one lead producer: "Sales aren't bad, but no one is pounding down our doors looking for lead."

Copper: Gloom Industry

Wire mills are the only bright spot in the copper industry. Brass mills continue to look for the avalanche of orders from the automotive industry. "But," explains one brass mill executive, "the worst could be over. We underestimated how much inventory Detroit was carrying, and tightening money controls will force all industry to carry less inventory throughout 1957."

Secondary producers report a spread of 35.50 to 36 cents a pound. Primary producers are quoting 36 cents a pound. Industry cutbacks in Europe are keeping most nonferrous prices depressed in foreign markets.

Market Memo

• Tin prices may be hitting the predicted downward spiral. At midweek the price was about 1.04 cents a pound.

NONFERROUS PRICE RECORD

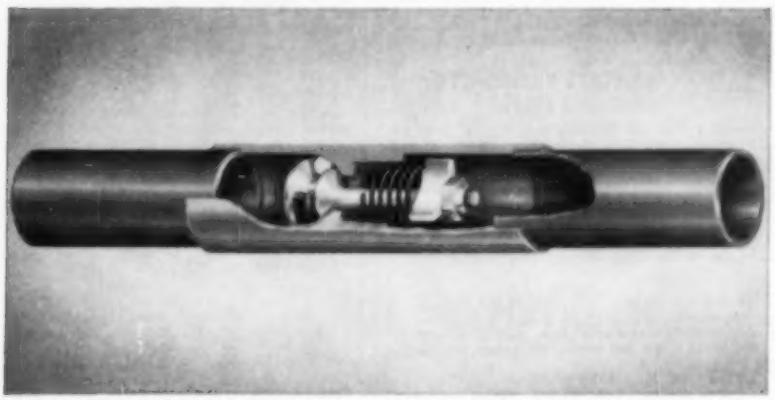
	Price Dec. 5	Last Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec., 1955 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.400
Copper	35.50-36.00	Nov. 28, 1956	36.00	35.958	38.365	46.053
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.338
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	32.500
Nickel	74.00	Dec. 6, 1956	64.50	64.500	64.500	64.500
Tin	104.50	Dec. 12, 1956	104.75	111.049	105.981	107.960
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co. — Reporting new developments in copper-base alloys and metalworking methods.



Cutaway of Circle Seal Products check valve shows care and precision needed to machine component parts.

Guaranteed Zero Leakage Check Valve Machined from Free-Cutting Brass Rod

Circle Seal Products Company, Inc., Pasadena, manufactures check, relief and shutoff valves which guarantee positive, leakproof sealing of gas and liquid under all pressure conditions. Used in air conditioner and a variety of other fluid applications, these valves have proved themselves both in the field and in the laboratory.

In their check valve, P13-355, Bridgeport's free-cutting brass rod, Ledrite #6 and copper water tube, Type L Hard Tempered, are used. This valve handles liquid or gas Freon 12 or 22 in the General Electric "Weatherton" heat pump, and positive zero leakage must be constant.

The valve housing (cutaway drawing shown above) containing the poppet "O" ring, spring, spring retainer and nut, is made of Ledrite #6 and requires two screw machining operations. Ledrite #6 was chosen primarily for its easy machinability and fine surface finish. It also provides excellent affinity for furnace brazing to the copper tube ends.

Surface finish of the valve body is doubly important, since the poppet "O" ring is made of a non-resilient material and must seat against a very smooth surface for absolute sealing. Both the poppet and spring seat are of Ledrite; the poppet requiring one machining operation and the spring seat a milling operation. Ledrite's outstanding machinability to close tolerances, and its ability to hold these tolerances, contribute to the basic sealing and flow resistance principles on which the success of the valve depends. Other factors which govern the choice of this alloy are its corrosion resistance, uniform composition and dimensional accuracy.

Ledrite, since its introduction, continues to serve an impressive variety of screw-machine applications. In many cases, operators have increased spindle speeds by as much as 100%, with a corresponding increase in production. It is exceptionally free-machining, which minimizes tool wear, and finished products are always smooth and clean surfaced.

Bridgeport copper water tubing, Type L Hard Tempered, has found wide application in plumbing, heating, refrigeration and air conditioning. Its economical qualities as well as long service life are two prime reasons for its wide acceptance.

These are but two of the many service-proved Bridgeport alloys that contribute to the success of countless products in a variety of industries. To learn more about how Bridgeport can help you and your product, call your nearest Bridgeport Sales Office.

Machining for Finish and Accuracy

Finish is affected by almost every condition encountered in machining. In many cases the problem is usually solved by higher machine speeds and lower feeds. However, machine-play in the spindle, lack of rigidity in the tool posts and ways, and the type of lubricant affect finish considerably. After these factors have been adjusted, there is the further problem of chip control; the rake and clearance angles of the tool. Too much clearance with large rake angles can be more troublesome than too little of each. Too much clearance and high rake angles cause chattering and hogging by permitting the tool to vibrate—even though minutely. When the front clearance is too small, a burnished or bumpy surface is the result and heat is increased through friction.

Accuracy—Probably the greatest single factor governing accuracy (discounting machine error) is chip control. Too much heat caused by friction is another deterrent to accuracy and is, in many cases, equally responsible. If the tool does not cut clean, the resultant increased pressure between the work and the tool forces the work away from the tool, thrusting the carriage back at the same time. When this condition exists, oversize parts are the result.

Undersize dimensions generally are caused by excessive heat. Variations in dimensions are the result of vibration in the machine or tool. Holding accurate sizes requires sharp tools at all times.

Aid to "Pre-Solving" Machining Problems

Tooling as well as product end use have to be considered when selecting an alloy for a particular purpose. This is not always an easy job. An alloy that can be machined economically on one production set-up may not necessarily perform as well on another.

To avoid these problems, it is advisable to consult your Bridgeport Salesman in making your selection. His advice and experience can help "pre-solve" many problems. (9332)

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY ♦ BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich. Sales Offices in Principal Cities— Conveniently Located Warehouses

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 13, 28.90; No. 43, 28.70; 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00 deld. Conn. valley; 36.00 deld. Midwest; custom smelters, 35.50-36.00 deld.; lake, 36.00 deld.; fire refined, 35.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 16.90, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 15 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ81C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$106 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $115-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $48.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 104.50; prompt 104.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $2.75; grade A-3 (0.5% Fe max), $2.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.20 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 15.00; No. 2, 19.00; No. 5, 15.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.25-30.00; No. 12 foundry alloy (No. 2 grade), 23.50-24.00; 5% silicon alloy, 0.60 Cu max, 26.00-26.25; 13 alloy, 0.60 Cu max, 26.00-26.25; 195 alloy, 26.00-26.50; 108 alloy, 24.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 23.00, grade 3, 22.25; grade 4, 21.75.

Brass Ingot: Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 30.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ81C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy). Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 41.35¢; l.c.l., 41.98. Weatherproof, 30,000-lb lots, 40.78; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.68; l.c.l., 49.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.25; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 5.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.128	40.90-45.40	....
0.125-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-56.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-56.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.9
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*28-48 in. widths or diam, 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.90	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60; Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.60	85.70-88.90
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 14.00-14.50; old sheets, 11.00-11.50; borings and turnings, 7.50-

BRASS MILL PRICES

MILL PRODUCTS a — SCRAP ALLOWANCES f

	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	58.13b	55.36c	....	58.32	32.000	32.000	31.250
Yellow Brass	50.19	40.17d	50.73	53.10	24.625	24.375	22.625
Low Brass, 80%	53.40	53.34	53.94	56.21	27.375	27.125	26.625
Red Brass, 85%	54.54	54.48	55.08	57.35	28.500	28.250	27.750
Com. Bronze, 90%	56.23	56.17	56.77	58.79	29.500	29.250	28.750
Manganese Bronze	57.88	51.98	62.22	....	23.000	22.750	22.250
Muntz Metal	52.19	48.00	....	....	23.125	22.875	22.375
Naval Brass	54.14	48.45	61.20	57.55	23.000	22.750	22.250
Silicon Bronze	62.44	61.63	62.48	64.61	31.250	31.000	30.250
Nickel Silver, 10%	65.91	68.24g	66.24	....	30.125	29.875	15.063
Phos. Bronze, A, 5%	77.25	77.75	77.75	77.93	33.000	32.750	31.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

8.00; crankcases, 11.00-11.50; industrial castings, 11.00-11.50.

Copper and Brass: No. 1 heavy copper and wire, 27.25-27.75; No. 2 heavy copper and wire, 25.75-26.25; light copper, 23.25-23.75; No. 1 composition red brass, 24.25-25.00; No. 1 composition turnings, 23.50-24.00; yellow brass turnings, 13.50-14.00; new brass clippings, 20.50-21.00; light brass, 14.50-15.00; heavy yellow brass, 16.00-16.50; new brass rod ends, 18.00-18.50; auto radiators, unsweated, 18.00-18.50; cocks and faucets, 18.50-19.00; brass pipe, 19.50-20.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-14.50.

Monel: Clippings, 75.00-90.00; old sheets, 75.00-80.00; turnings, 70.00-80.00; rods, 75.00-90.00.

Nickel: Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00; rod ends, 130.00-195.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.50-19.00; 3003 clippings, 18.50-19.00; 6151 clippings, 18.50-19.00; 5052 clippings, 18.50; 2014 clippings, 17.50-18.50; 2017 clippings, 17.50-18.50; 2024 clippings, 17.50-18.50; mixed clippings, 17.50; old sheets, 14.00; old cast, 16.00; clean old cable (free of steel), 18.00-18.50; borings and turnings, 15.75-16.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 58.00; light scrap, 54.00; turnings and borings, 38.00.

Copper and Brass: No. 1 heavy copper and wire, 30.75; No. 2 heavy copper and wire, 29.25; light copper, 27.00; refinery brass (60% copper) per dry copper content, 27.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 30.75; No. 2 heavy copper and wire, 29.25; light copper, 27.00; No. 1 composition borings, 27.00; No. 1 composition solids, 27.50; heavy yellow brass solids, 19.00; yellow brass turnings, 18.00; radiators, 21.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 54.29; oval, 53.42. 5000-10,000 lb; electrodeposited, 45.78; 2000-5000 lb lots; cast, 48.04, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb 123.50; 200-499 lb, 122.00; 500-999 lb, 121.50; 1000 lb or more, 121.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 10 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. Prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. Prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 72.80; 100-600 lb, 65.20; 700-1900 lb, 62.70; 2000-9900 lb, 61.00; 10,000 lb or more, 59.80.

Stannous Chloride (anhydrous): Less than 25 lb, 171.40; 25 lb, 136.40; 100 lb, 121.40; 400 lb, 119.00; 5200-19,600 lb, 106.80; 20,000 lb or more, 94.60.

Stannous Sulphate: Less than 50 lb, 133.90; 50 lb, 103.90; 100-1900 lb, 101.90; 2000 lb or more, 99.90.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

WANTED

PRODUCTION MANAGER

REPUTABLE METAL WORKING COMPANY HAS OPENING FOR A PRODUCTION MANAGER EXPERIENCED IN PRODUCTION SUPERVISION WITH THE POTENTIAL TO BECOME VICE PRESIDENT FOR MANUFACTURING. ENGINEERING DEGREE DESIRABLE BUT NOT ESSENTIAL. EXPERIENCE IN METAL WORKING OR ALLIED INDUSTRY REQUIRED INVOLVING FORGING, BLANKING AND FORMING AND METAL FINISHING. PRODUCTION CONTROL EXPERIENCE IS DESIRABLE. EXCELLENT SALARY AND WORKING CONDITIONS. POTENTIAL FOR PERSONAL PROGRESS. FORWARD RESUME OF EDUCATIONAL AND EXPERIENCE BACKGROUND TO BOX 495, STEEL, PENTON BLDG., CLEVELAND 13, OHIO.

(5) 70 Ton Overhead Traveling CRANES

(2-P & H, 1-NILES, 2-MORGAN)

Each 70 ton bridge equipped with (2) 35 ton trolleys and 5 ton auxiliary hooks—74'8" span—230 volt D.C. Cab operated—available for current delivery—excellent condition—fraction of replacement cost. Location Phila.

LURIA BROTHERS & COMPANY, INC.

PHILADELPHIA NATIONAL BANK BLDG., PHILA. 7, PA. Rittenhouse 6-7455

WANTED TO BUY

STEEL DISTRIBUTOR

WAREHOUSE PLANT FOR CASH

REPLY BOX 494, STEEL

PENTON BLDG., CLEVELAND 13, OHIO

REDUCE YOUR PRODUCTION COSTS

BY UP TO 50%

Increasing numbers of U.S. firms now taking advantage of low cost Japanese production facilities. Can offer tremendous savings on finished products, sub-assemblies & parts, especially those requiring hand labor. All parts to be guaranteed in conformance with your specifications. For details write

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35 Main St. San Francisco, Calif.

CLASSIFIED

Help Wanted

COMBUSTION OR INSTRUMENT TECHNICIAN for supervisory position in small integrated steel plant. Open Hearth and Heating Furnace experience preferred. Please state age, experience, and qualifications in reply to Box No. 493, STEEL, Penton Bldg., Cleveland 13, Ohio.

CHIEF DESIGN ENGINEER—Mechanical Engineer degree preferred—Broad experience required for design of facilities for integrated steel plant located in Southwest. Excellent opportunity in a well established, fast expanding organization. Pension plan, group hospitalization, vacation, sick leave, etc. Submit complete personal and professional resume in first letter. Reply Box 496, STEEL, Penton Bldg., Cleveland 13, Ohio.

POSITION OPEN

Young engineer, metallurgical, mechanical, or aircraft structural, for technical-administrative position in large, comprehensive, long range materials project. Should like to write and edit technical reports, deal daily with engineering personnel, meet new people, and assume some administrative responsibilities. Will work directly with experienced technical personnel in informal, fast-moving, congenial environment. Will consider exceptionally qualified new graduate.

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CLASSIFIED RATES

All classifications other than "Positions Wanted" set solid. 50 words or less $15.00, each additional word .30; all capitals, 50 words or less $19.20, each additional word .38; all capitals leaded, 50 words or less $23.40 each additional word .47. "Positions Wanted" set solid, 25 words or less $3.60, each additional word .14; all capitals, 25 words or less $4.50, each additional word .18; all capital leaded, 25 words or less $5.40, each additional word .22. Keyed address takes seven words. Cash with order necessary on "Positions Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

Abrasive Cutting | *the best way to cut many materials the only way to cut some*

Campbell Cut-Off Machines

• Cutting 20-foot tubes of stainless steel into 1" to 17" lengths

Slice $32,000 a year from tube cutting costs

• Because CAMPBELL Abrasive Cut-Off Machines not only cut stainless steel tubes twice as fast as former methods—but the clean cut saves a deburring process — Ryan Aeronautical Company saved $32,000 the first year of its operation.

Ryan uses thousands of pieces of this stainless steel tubing each month in ball-and-socket joints, nipples and sleeves of exhaust systems. They must be precision-cut from 20-foot pipe in lengths from 1 to 17 inches.

The smooth-finish cut of the CAMPBELL Oscillating Wet Abrasive Cut-Off Machine is extremely accurate — with no hard spots, no change in metallurgical characteristics. It results from the WET cut with abundant coolant supplied just where it will do the most good. Speed and economy come from the OSCILLATION of the abrasive wheel . . . the right one for the job.

Some additional performance figures

Smooth cutting on CAMPBELL Oscillating Wet Abrasive Cut-Off Machine saves an extra grinding operation on gear tooth samples cut for metallurgical study.

International Nickel's tough K Monel, 4¾" dia., is cut in 2 minutes per cut on a CAMPBELL Oscillating Wet Abrasive Cut-Off Machine.

How to get expert advice on your cutting problems

• CAMPBELL Engineering Service costs you nothing—can save you much. Does your metal cutting problem involve cutting of alloy or high carbon steel? Our Field Engineers are abrasive cutting specialists. They can help you arrive at just the right combination of a CAMPBELL Cut-Off Machine and ALLISON Cutting Wheel that will improve your operation and save you money.

Let us send you this book

ACCO

Campbell Machine Division
AMERICAN CHAIN & CABLE

925 Connecticut Avenue, Bridgeport 2, Connecticut

(*Concluded from page* 141)

season. But inventories continue to be low.

The cast scrap market is steady. Steel grades are slow.

The export market is strong, particularly on the Gulf Coast. New Orleans exporters are reported paying $62-$63 for No. 1 heavy melting.

San Francisco—Prices on the top grades of cast scrap slipped slightly here last week as foundry demand continued to lag.

Seattle—Scrap is unchanged at $54 and $51 for No. 1 and No. 2 heavy melting steel.

Weather has cut shipments from east of the Rockies. But turnover is heavy because both domestic and foreign buyers are active.

Los Angeles—With near-capacity steel production continuing, scrap sales are rising. For most dealers, the fourth quarter will be the most active of the year, and about 10 per cent better than the preceding three months. Prices are reported firm.

Rails, Cars . . .

Track Material Prices, Page 134

Deliveries of freight car builders are edging up to 6000 units a month. This reflects some increase in steel receipts, though this is not true of certain products. A total of 5666 cars was delivered in October, compared with 3444 in September.

Iron Ore . . .

Iron Ore Prices, Page 138

Although ice conditions in the upper lakes areas are reported to be worsening rapidly, officials of the Pittsburgh Steamship Division, U.S. Steel Corp., still hope an additional 800,000 tons of iron ore can be brought to the lower lakes. Its plans call for last cargoes to be taken on Dec. 22. Last midweek, 51 of the division's 58 carriers were in operation.

Total shipments of iron ore down the Great Lakes in the week ended Dec. 10 was 614,040 tons, reports the Lake Superior Iron Ore Association. This compares with 91,172 in the like week a year ago. Season shipments to Dec. 10 were 77,189,750 tons, compared with 87,459,853 tons to the same date in the 1955 season.

Advertising Index

Aetna-Standard Engineering Co., The ..... Inside Back Cover
Air Products, Inc. 115
Air Reduction Sales Co., A Division of Air Reduction Co., Inc. 36
Ajax Flexible Coupling Co., Inc. 111
Allis-Chalmers ..... Inside Front Cover
Aluminum Company of America 16, 38, 39
American Broach & Machine Co., A Division of Sundstrand Machine Tool Co. 18
American Chain & Cable, Campbell Machine Division 148
American Machine & Foundry Co., Cleveland Welding Division 139
American Metal Market 108
American MonoRail Co. 150
American Screw Co. 45
American Steel & Wire Division, United States Steel Corporation 31
American Welding & Manufacturing Co., The 46
Anaconda Wire & Cable Co. 103
Atlas Car & Mfg. Co., The 10
Avey Drilling Machine Co., The 20, 21

Baker-Raulang Co., The 3
Baltimore & Ohio Railroad 80
Bethlehem Steel Co. 1
Birdsboro Steel Foundry & Machine Co. 120
Blaw-Knox Co., Foundry & Mill Machinery Division 32, 33
Bliss, E. W., Co., Mackintosh-Hemphill Division 35
Bridgeport Brass Co. 145
Browning, Victor R., & Co., Inc. 140

Campbell Machine Division, American Chain & Cable 148
Carborundum Co., The 17
Carlson, G. O., Inc. 7
Carpenter Steel Co., The, Alloy Tube Division 130
Chambersburg Engineering Co. 22
Chicago Rawhide Manufacturing Co., Sirvis Division 61
Cincinnati Grinders, Inc. 62
Cincinnati Milling Machine Co., The, Cincinnati Milling Products Division 37
Cities Service Oil Co. 84
Cleveland Tramrail Division, The Cleveland Crane & Engineering Co. 42
Cleveland Welding Division, American Machine & Foundry Co. 139
Climax Molybdenum Co. 19
Colorado Fuel & Iron Corporation, The 40, 41
Columbia-Geneva Steel Division, United States Steel Corporation 31
Copper & Brass Research Association 43

Detroit Steel Corporation 50, 72
Drave Corporation 52
Dresser Industries, Inc., Dresser Manufacturing Division 140
Dykem Co., The 140

Eastern Machine Screw Corporation, The 140
Elastic Stop Nut Corporation of America 11
Erie Bolt & Nut Co. 123

Federal Products Corporation 23
Follows Gear Shaper Co., The 26
Foote Mineral Co. 12

Great Lakes Steel Corporation 66

Hanson-Van Winkle-Munning Co. 44
Harrington & King Perforating Co., The 73
Hepponstall Co. 74
Herr Equipment Corporation, The 128
Homestead Valve Manufacturing Co. 137
Hooker Electrochemical Co. 126

Jones & Laughlin Steel Corporation 106

L & J Press Corporation 122
Lamson & Sessions Co., The 83
Landis Tool Co. 14, 15
La Salle Steel Co. 79
Lindberg Engineering Co. 28, 29
Lombard Corporation 140
Lord Baltimore Hotel, The 141
Lukens Steel Co. 118
Lukens Steel Co., Lukenweld Division 8
Lukenweld, A Division of Lukens Steel Co. 8
Luria Brothers & Co., Inc. 143

McKee, Arthur G., & Co. 97

Mackintosh-Hemphill Division of E. W. Bliss Co. 35
Mahon, R. C., Co., The 77
Micromatic Hone Corporation 116, 117
Micro Switch, A Division of Minneapolis-Honeywell Regulator Co. 93
Minneapolis-Honeywell Regulator Co., Micro Switch Division 93

National Steel Corporation 66
National Tube Division, United States Steel Corporation 31
Norfolk & Western Railway 110
Norton Co. 13

Ohio Crankshaft Co., The 2
Ohio Ferro-Alloys Corporation 95

Peterson Steels, Inc. 124
Pratt & Whitney Co., Inc. 125

Reliance Steel Division, Detroit Steel Corporation 72
Republic Steel Corporation 24, 25
Ross Operating Valve Co. 70
Ryerson, Joseph T., & Son, Inc. 49

Seymour Manufacturing Co., The 5
Square D Co. 104
Standard Pressed Steel Co., Hallowell Shop Equipment Division 34
Sundstrand Machine Tool Co., American Broach & Machine Co. Division 18
Sun Oil Co., Industrial Products Department 9

Tempil Corporation 6
Tennessee Coal & Iron Division, United States Steel Corporation 31
Thomas Flexible Coupling Co. 114
Thomas Machine Manufacturing Co. 127
Timken Roller Bearing Co., The ..... Back Cover
Treadwell Engineering Co. 30

United Engineering & Foundry Co. 109
United States Steel Corporation, Subsidiaries 31
United States Steel Export Co. 31
United States Steel Supply Division, United States Steel Corporation 31
Upson-Walton Co., The 149

Vanadium Corporation of America 99
Vooder-Root, Inc. 4
Vorson Allsteel Press Co. 69

Ward Steel Co. 108
Westinghouse Electric Corporation 112, 113
Wickwire Spencer Steel Division of The Colorado Fuel & Iron Corporation 40, 41
Wheelock, Lovejoy & Co., Inc. 27
Wheland Co., The 141

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Table of Contents, Page 5

Classified Advertising, Page 147

UPSON-WALTON

malleable wire rope clips

NOW! Packaged for your convenience

U-W packaged malleable wire rope clips save your time in re-shipping, counting, checking inventory. Clips from ⅛″ through ¼″ sizes are packed in boxes that save space, carry full instructions for proper use.

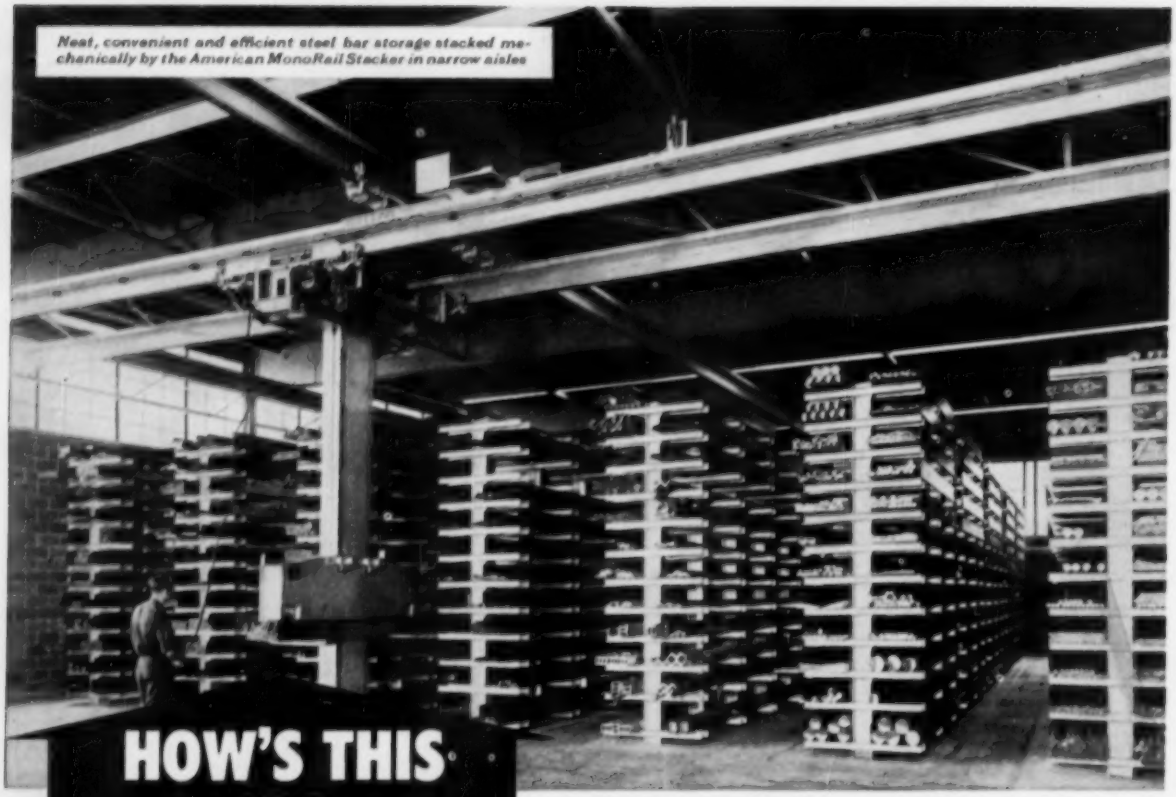
Sell Upson-Walton quality products . . . engineered for safety. Complete line of tackle blocks, rope fittings and wire rope manufactured. Write for literature.

THE UPSON-WALTON COMPANY

Established 1871

12500 ELMWOOD AVENUE • CLEVELAND 11, OHIO

New York • Chicago • Pittsburgh



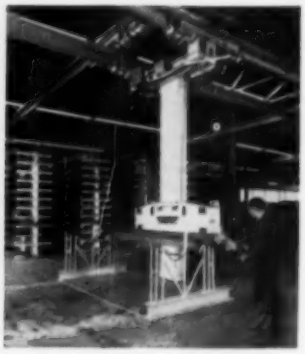
Neat, convenient and efficient steel bar storage stacked mechanically by the American MonoRail Stacker in narrow aisles

HOW'S THIS FOR STEEL STORAGE!

American MonoRail engineers, working with Hawkridge Brothers Company, designed this system for storing bars, rods and other long steel shapes.

Note the extremely narrow aisles and maximum height of racks. Bars and rods, 20-22 feet long, are placed in pans 18 feet long. The American MonoRail Stacker transfers these pans to either side of an aisle for storage.

MonoRail Stacker forks support bar in saw. Saw with extension rolls to any convenient spot in the warehouse.



American MonoRail Stacker lowers a banded bundle of bars over prongs which ingeniously splits bands, lets bars roll into trough for pick-up in a tray.

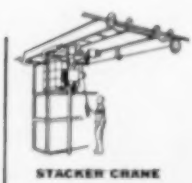
Photos: Courtesy of Hawkridge Brothers Company, Waterbury, Conn.

Member of Materials Handling Institute - MonoRail Association

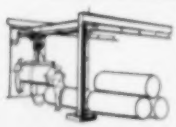
AMERICAN
MONORAIL
COMPANY

13102 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)

AUTOMATIC DISPATCHER

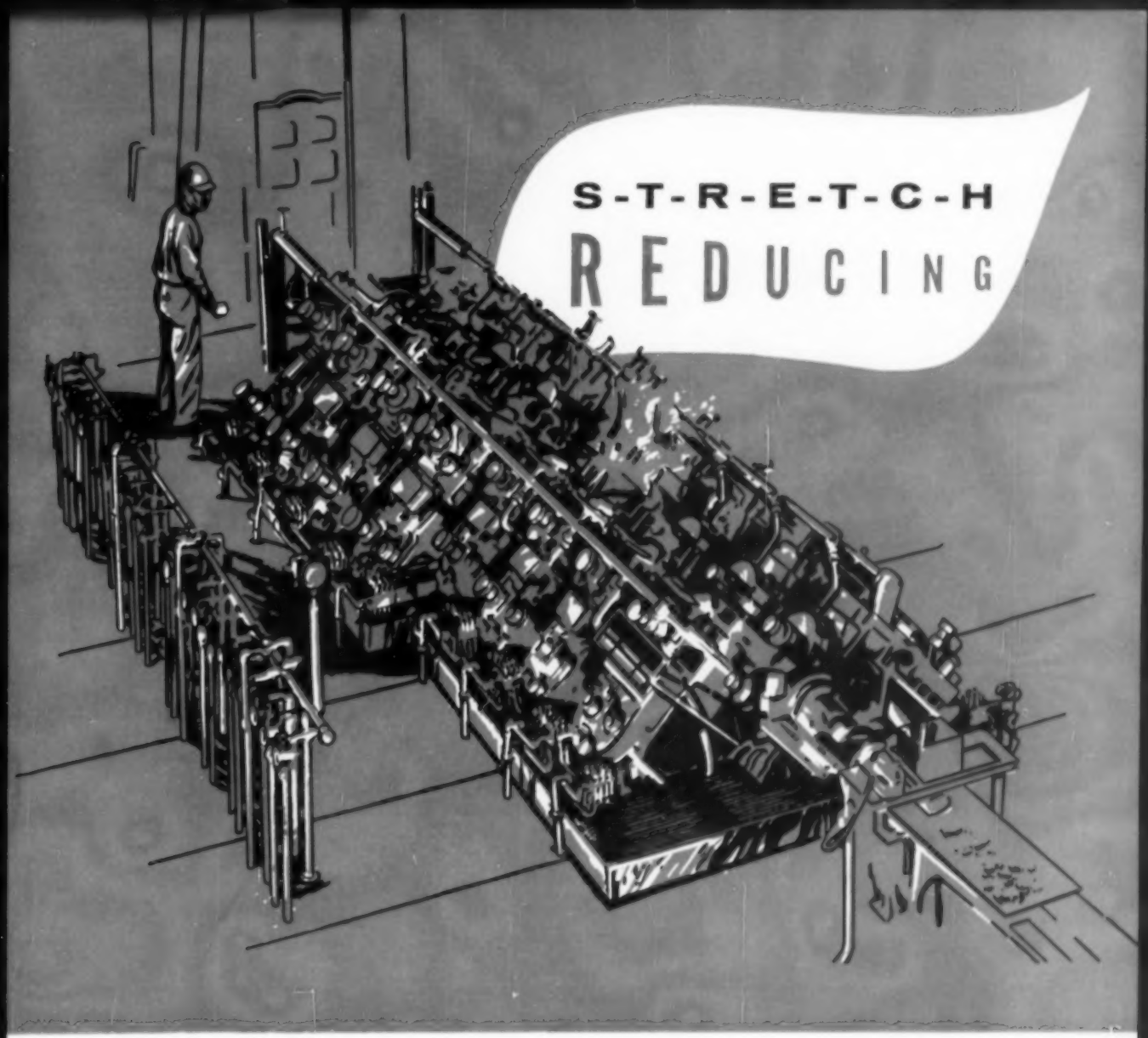


STACKER CRANE



MANUAL MONORAIL

RETRACTABLE CRANE



● Much of the news in Seamless concerns the Stretch Reducing principle. The first such mill was installed by National Tube Division of U. S. Steel Corporation. Aetna-Standard collaborated with National Tube in designing this mill and supplying the equipment. Since that time, much development work has been done on the equipment and the process.

Chief advantage of the Stretch Reducing method is the resulting increase in tonnage from existing Seamless Tube Hot Mill equipment for the production of A. P. I. steel tubing. Briefly, tubes of the larger O. D. (6″ to 7″) are produced through the existing Piercer, Plug Mill and Reelers, thereby obtaining a maximum number of tubes at an increased tonnage per operating hour.

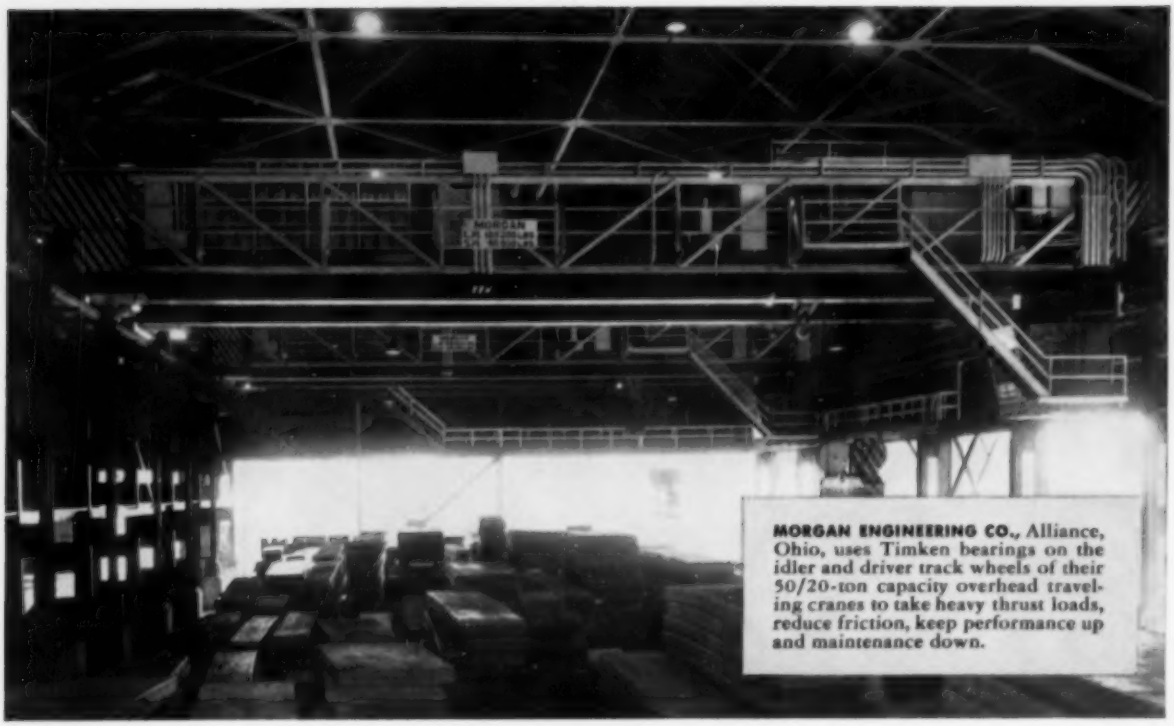
Aetna-Standard has built and is building most of the Stretch Reducing mills. If your group needs facts on cost, design, yield and other information, Aetna's Seamless engineers can help you.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. **PLANTS: ELLWOOD CITY, PA., WARREN, OHIO**

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



MORGAN ENGINEERING CO., Alliance, Ohio, uses Timken bearings on the idler and driver track wheels of their 50/20-ton capacity overhead traveling cranes to take heavy thrust loads, reduce friction, keep performance up and maintenance down.

Morgan Cranes move hot slabs fast

...TIMKEN® bearings cut traveling costs

THESE Morgan heavy-duty cranes move hot steel slabs from cars to storage in an Eastern steel mill and do it fast. To be sure they keep rolling and at minimum cost, Morgan engineers mounted the idler and driver track wheels on Timken® tapered roller bearings. They keep them on the go with minimum maintenance.

The tapered construction of Timken bearings lets them take *both* radial and thrust loads in any combination. And full line contact between the rollers and races gives Timken bearings *extra* load-carrying capacity. They can take the heavy thrust loads of crane operation in stride. No additional thrust devices are needed. Longer bearing life is assured. Cranes keep rolling.

Timken bearings practically eliminate friction because they are designed by geometrical law to have true rolling motion and are made microscopically accurate to conform to their design. Because friction is reduced wheels and loads roll smoothly. Costly maintenance drops, power is saved.

And by holding housings and shafts concentric, Timken bearings make closures more effective. Dirt and dust stay out; lubricant stays in. Lubricant and upkeep costs are also decreased.

What's more, Timken bearings shrug off shock loads. They're case-carburized to give them hard, wear-resistant surfaces over tough, shock-resistant cores.

Only Timken bearings give you so many advantages. Always specify Timken bearings for the machines you buy or build. Be sure the trade-mark "Timken" is on every bearing —it's your assurance of full, money-saving value. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

REVOLUTIONARY BUCYRUS PLANT HELPS HOLD DOWN RISING COSTS

At a new plant in Bucyrus, Ohio, the Timken Company has substantially reduced the cost of tapered roller bearings by: 1) producing these bearings under a new system of extreme mechanization; 2) standardizing on 15 bearing sizes with the widest applications throughout industry. Manufacturers can take advantage of these lower costs by redesigning applications to use these Bucyrus sizes. And as more switch to Bucyrus bearings, production costs can drop still further, meaning even lower costs to you.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◐ AND THRUST —◐— LOADS OR ANY COMBINATION ✳